

CHEMICAL INDUSTRIES

OCTOBER, 1936

Consulting Editors

Robert T. Baldwin
L. W. Bass
Frederick M. Becket
Benjamin T. Brooks
J. V. N. Dorr
Charles R. Downs
William M. Grosvenor
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"WORDS CANNOT EXPRESS THE VALUE OF THIS BOOK TO INDUSTRY" *

"The exhaustive technical data this book contains will be of considerable value to us in the course of our business."*

"The book is certainly a valuable and convenient source of information for present and future use. One can safely say it exceeds the details given in advance notices."*

"I want to compliment you on the splendid job which was done in accumulating the information in this book. It certainly reflects credit to the effort which it must have taken."*

"I'm sure this publication will be interesting and enlightening to anyone who has use for caustic soda."

"This is a very interesting brochure on the subject and we hope that conditions will permit us to change over to the liquid product within a few months."*

"... moved to be so interesting that we would ask you to let us have four more copies for our foremen."

**Cutting Costs with
Liquid Caustic Soda**

FREE TO PLANT EXECUTIVES AND TECHNICAL MEN

* Quoted from the letters of executives (names on request) in a variety of industries, these remarks typify the warm reception accorded the new handbook, "Cutting Costs with Liquid Caustic Soda." Executives, buyers, chemists and operating men alike are enthusiastic about this new book which they find packed full of useful information for both present and potential users of liquid caustic soda. Its 72 pages

contain material of practical value to the entire plant organization — material based upon the wide experience of the Mathieson technical staff and upon data gathered from authoritative reference sources. This book will be sent upon request to anyone interested in the use of liquid caustic soda. If you have not already received your copy why not send for it today?

The MATHIESON ALKALI WORKS (Inc.), 60 East 42nd St., New York, N. Y.

The Reader Writes:—

Two and a Half Per Cent. Ain't So Much!

We think a lot of your useful publication and subscribe thereto. In spite of this fact we expect to help carry the Middle West at least $2\frac{1}{2}$ per cent. to 1 per cent. for Roosevelt. We think this should be a fair warning to you so the shock will not be too great when it comes, and it is our sincere wish that CHEMICAL INDUSTRIES survives in spite of the fact we may have a Dictatorship in Washington instead of the "gang of exploiters" they had down there between the years of 1920 and 1932.

Detroit, Mich.

PHILIP A. PATTERSON

Wanted—What Kind of Chemists?

The recent symposium, "What Industry Wants of its Chemists," at the Pittsburgh American Chemical Society meeting was one of the most forward-looking moves that that group has made in several years. But why was it so late in materializing? A great deal of waste motion in the last fifteen years could have been avoided if this subject had been periodically considered and the industrial and scholastic viewpoints readjusted to fit the ever-changing conditions. To argue who is to blame is unnecessary except in-so-far as it helps to correct the conditions in the future.

Our chemical industrial leaders have shown too little interest in the training of those upon whom the task of carrying on our future technical and business activities must fall. Our college professors have had a woeful lack of knowledge of the industrial and business sides of chemistry.

Encouraging then was this sign of a belated recognition that a two-fold responsibility exists. I suggest that some of our chemical business leaders closely question half-a-dozen of our recent graduates in chemistry or even chemical engineering. The result will be enlightening. Most of them think only in test-tube quantities and have very little, if any, conception of the business or merchandising angles. Some day some college is going to give our young men a chemico-economic training that will be worth millions to the chemical industry. But when?

Boston Mass.

WALTER MORGAN

Try and Get It

I would like to suggest that you print more detailed technical articles with actual information of size of equipment and operating information. In a course in design here, the literature is very vague as to capacities of equipment and quantities of material processed.

Minneapolis, Minn.

C. S. GROVE, JR.
University of Minnesota

Has An Editor No Feelings?

At times I am inclined to feel that your editorials are too political. Otherwise CHEMICAL INDUSTRIES is a real magazine. Your feature articles are usually authoritatively written and help keep one abreast.

Glendive, Mont.

W. A. COOPER

Two Years Time and Twelve Issues Space

I like the industrial history articles and have had a seminar course using the material. I hope you will give a comprehensive article on the subject, "History of Industrial Chemistry in the U. S."

Ames, Iowa

O. R. SWEENEY
Iowa State University

That Tax on Sulfur

Louisiana's two dollars a ton tax on crude sulfur is a sample of the practical working out of the soak-the-rich theories that run rampant among all our governmental tax-collecting agencies from Washington to Podunk and it is one that chemical people can understand very easily. It is in the cards that the price of sulfur must be reduced, or our American position of dominance in world markets of important chemical raw materials will be jeopardized. The threat has been double-edged, for technological changes are very materially cutting down the consumption of sulfur derivatives (notably the use of sulfuric acid in petroleum refining) while at the same time the supply of sulfur from by-product or recovery operations is being markedly augmented. Furthermore the output of sulfur in Italy, Japan, Chile, and even in Palestine is being stepped up almost daily. The inevitable economic result is (or at least should be without interference with the free play of supply and demand) lower sulfur prices. At such a time, to lay a \$2-a-ton burden on the shoulders of our American sulfur producers is suicidal, and the Governor of Texas has just come out and promised his state will "equalize" the new Louisiana tax!!

Such taxation also shows how everyone's pocket is picked. Do the politicians of these two southern agricultural states realize that sulfuric acid for fertilizers is the one largest consumer-use of sulfur? Other big uses are in making rubber tires, insecticides, electric batteries, and lubricants, all items in the farmer's cost of living.

You have touched on this subject before, but you should again and again point out that there are peculiar risks and far-reaching, unexpected results that come from legislative monkeying with chemical progress.

Fort Smith, Ark.

HAL. B. STAMFORD

Thanks a Million

Your editorials are very timely and one may have faith in them because they are written by one who has the scientific point of view. The feature articles have an interest in new industrial products and methods.

Salina, Kansas

WALTER S. LONG

Maybe Mussolini Might

Cannot some one make the sales department give the chemical name along with the trade name so we know what the material really is?

Seattle, Wash.

KENNETH A. KOBE
University of Washington

Echoes of 1929

I am a registered pharmacist, but am desirous of getting out of the retail drug business. I am attracted to the chemical business because it seems to have great opportunities for the future. How should I go about getting a position that would naturally lead to a sales manager? Would you advise my going with a big company or a small one? What salary should I ask for? What salary does the head salesman of a chemical company usually get? I have my own car, and what allowance is usually paid for that? Are Bakelite and Cellophane considered a part of the chemical business? What is the percentage of profit in selling a heavy chemical, like sulfur acid, compared with selling a trade-marked chemical like Carbona. Thanking you for your prompt attention.

Brooklyn, N. Y.

SIMEON K. GREENWALD

CHEMICAL INDUSTRIES

VOLUME XXXIX



NUMBER 4

Technical Service

LONG smoldering questions concerning technical service rendered to customers have burst into flame under the forced draft of the Patman Law. What is fair and reasonable chemical assistance to a consumer? How profitable is it to the seller? These questions can seldom be determined to the full satisfaction of both parties. There are no scales that weigh technical service with precision; and on the one side are purchasers who make fantastic demands while on the other are competitors who bewail unfair competition. Between these extremes are all shades of opinion on all sorts of dubious cases.

When the first Muspratt introduced caustic soda to the British soapmakers he was forced to demonstrate its use at the kettles and to give away "working samples". We still employ these methods to launch the newest solvent or the latest wetting out agent. But during the past century the work of the chemical missionary has become progressively more intricate, till we are enmeshed in an admittedly necessary and effective selling technique that materially increases the always rising overhead expenses.

The complete chemical and engineering services offered by our larger companies have contrary effects upon their smaller competitors and the smaller consumers. They handicap the smaller chemical makers. They help the smaller chemical users to compete with firms better equipped technically than they. Thus, judged by their advertised objective, the sponsors of anti-discrimination legislation by including technical services are attaining ambiguous results. But at least the law will force the chemical industry to look squarely at technical service as a selling expense and to impress on its customers the cash value of "free" advice.

It has not been widely publicized nor even clearly defined in its purpose and program, but the separate corporation organized by Dow to render technical engineering service for reasonable fees is the most original solution proposed, one that possesses some truly revolutionary possibilities. It might solve the industry's free service problems, but it would surely create some new problems for the professional chemical consultants.

Shifting the Dye Quotas

Production of coal-tar dye-stuffs throughout the world has increased rapidly during the past eighteen months; but progress among the dye-making nations has been extremely uneven. Save for our own Dye Census, no set of figures makes any pretense of official accuracy; but the estimate of Sir Henry Sutcliffe Smith, Chairman of the British Colour Users Association, is no doubt quite representative: Germany, 76,750 tons; U. S. A., 44,752 tons; Great Britain, 26,211 tons; Japan, 19,680 tons; Russia, 24,600 tons; France, 10,480 tons; Switzerland, 6,681 tons. The order of this roster will be radically upset if current production is maintained.

During last year, with an estimated world-wide increase in output of 15 per cent. total, the Japanese virtually doubled their exports. During the same period we increased our dye exports one-fifth, Germany one-seventh, and England one-tenth. Translated into tons, assuming that the ratios of export and domestic business were not materially changed, this would mean an increase for Japan of 10,000 tons, for the United States about 9,000 tons, for Germany 7,000 tons, and for Great Britain 2,500 tons.

Viewed internationally the rapid rise of the Japanese dye industry is the outstanding development. The consolidation of the Imperial and the Mitsubishi with a capital of 2,500,000 yen and the recent sale of 400 tons of sulfur dyes to Holland are recent news items exemplifying this advance. Since the Dutch market is the cockpit of the dyestuff world, the big order for large-tonnage, low-price sulfur colors is indicative at once of the will and the ability of the Japs to sell in world competition. Coal-tar dyes are one of the particular pets in their chemical program, but they are not the sole chemical products that they once imported and are now profitably exporting. They have invaded our own market with bicarbonate of soda, high-test hypochlorites, and other standard industrial chemicals, so we have a new, aggressive competitor in our domestic fields.

Which Container for What and Why

Those bulk containers in which industrial chemicals are shipped have been, quite naturally, the cross-eyed stepchildren of the attractive, informing "Container Shows" sponsored by the American Management Association. New developments are technical rather than artistic. Yet for this very reason, there is necessity

for cooperation between maker, shipper, and receiver.

The Association is therefore providing a program that will give the opportunity to discuss drums and bags. The meeting next Spring, first proposed and enthusiastically furthered by R. W. Lahey of Cyanamid, will be profitable for chemical executives. No committees of the Manufacturing Chemists Association do more work of lasting value than the container groups, and the problems of what container for which material will handsomely repay a more sympathetic understanding on the part of management.

Scientific Censorship

The blatant protest of the professional bureaucracy of the medical profession over the discussion of a new medicinal chemical at the recent meeting of the American Chemical Society must leave a very nasty taste in the mouths of many physicians and most chemists. Such boorish insolence is not the proper way for one scientific body to approach another. The professed purpose of protecting the layman must have been largely defeated by the blasts of publicity which called wide attention to a paper the normal discussion of which would have attracted but little general attention. Its cool assumption of the right to censor any chemical discussion of *materia medica* by chemists is so opposed to the very essence of the scientific spirit that anyone may reasonably suspect that the American Medical Association is now more concerned with preserving its monopoly of all medical information than of promoting therapeutics. The whole unpleasant business is a very pretty example of an underbred and over-paid secretariat running a racket under the guise of professional ethics.

Chemistry has made great contributions to medicine—so great that, save for the surgeon, the chemist is without a rival in the transformation of medicine from art to science. Chemists have well earned the right to discuss at their professional meetings the medicinal properties of chemical compounds, and the indiscretion of a press bureau does not abrogate that right nor confer the powers of censorship upon Dr. Fishbein. That is the logic of mediavalism, and so while we are proud of the dignity with which the American Chemical Society met this trying situation, we are ashamed that they should have knuckled down and agreed to anything further than a wholly voluntary, cordial, untrammelled cooperation between two professional associations devoted to seeking out scientific truths.

Dr. Hans Heymann of Berlin Tells Why

Property-life Insurance Can Solve Tax-Surplus-Depreciation Problems

CHEMICAL manufacturing has the highest rate of depreciation combined with the fastest rate of obsolescence of all industries. This has long been suspected by discerning chemical executives. It has been proved in Germany. Over there nearly twenty years of actuarial study of the costs of plant replacement, undertaken as the basis for premium rate-making by the pioneer company in the new field of property-life insurance, has demonstrated that this suspicion is unpleasantly correct.

Prudent chemical executives have long appreciated that the depreciation permissible under the Income Tax Law has been utterly inadequate to provide for necessary plant replacements. How inadequate such allowances have been may also be learned from the German experience. Upon the basis of facts developed by property-life insurance, foresighted chemical companies in Germany are writing off their apparatus in from three to five years, a depreciation of from 20 to 33 per cent. annually. Such rates of depreciation, which impartial insurance statistics prove to be necessary to conserve the capital invested in chemical equipment, would certainly be regarded by the U. S. Treasury Department as a bald attempt at tax evasion.

Accordingly, American chemical executives have been forced to build up cash reserves to provide for plant replacements. Now the Undivided Surplus Tax with stinging penalties upon any expenditure made for plant enlargements, plant improvements, or plant replacements, must be paid. Operating plants that are notoriously short-lived; charged with tax-evasion if these are properly depreciated; penalized when they invest earnings in capital expenditures; our chemical executives

have a triple-threat problem in taxes and surplus and depreciation.

In the midst of this dilemma, with alternatives that since the recent enactment of the Undivided Surplus Tax have become fatal, there has arrived in New York an original financial genius who proposes a way out.

Of late there has been a good deal of inquisitive speculation about property-life insurance. The idea of insuring machines and buildings against defects and break-downs, at the same time building up a sort of "endowment fund" to provide for their replacement in three, five, ten, fifty years, is engaging. But does it work out practically? And what does it cost? And how can it help us in this pressing problem of tax-surplus-depreciation?

Dr. Hans Heymann is preeminently qualified to make reply. He is the originator of this same property-life insurance. He organized, in 1920, the first Property Life Insurance Company and with Director Thieme of the Munich Reinsurance Company so successfully brought the new venture through the wild German inflation that its capital increased from a modest 65,000 gold marks to 900,000 gold marks. This would appear to be the acid test of the practical workability of his ideas.

Dr. Heymann has had a varied financial and insurance experience. He studied at Berlin and his thesis at Koenigsberg was on "The Social Maintenance of Property Values on the Basis of Insurance." After graduation, however, he was drawn to financial circles and had practical banking training in Hamburg, London, Paris, and New York. His experiences in the San Francisco fire and during the run on the old Knickerbocker Trust Company in New York brought



vividly before him his university studies on insurance of permanent values; and with Dr. Hoeckner, "old master of the German insurance actuaries," he worked out the mathematics of property-life insurance. He served the German Foreign Office in important advisory capacities till the Socialist Revolution; did much to help stabilize the gold reichsmark and reform German finance; wrote, at the request of Foreign Minister Rathenau, his book, "The Bank of Nations," which first outlined the principles upon which ten years later the International Bank was founded in Basle.

Property-life Insurance Simple

Physically Dr. Heymann is a big man, with generous features, and when I asked him the first question that everyone in the chemical industry would naturally put to him, he spread out his large hands depreciatingly and smiled expansively.

"That is not difficult," he said in his carefully chosen English, "for after all, property-life insurance is quite simple. It is like this—when you buy a new automobile, you get a guarantee against defect and for performance from the manufacturer. Naturally this is a limited guarantee—for so many days, so many miles. Property-life insurance enables you to extend that guarantee for the life of the car.

"But more than this, property-life insurance covers damage to the car from accidents and at the same time enables you to build up a sort of endowment fund so that at the end of two years or five years (according to the amount of the premiums you choose to pay) you will have the money to replace the car with a new one. Even more than this, the property-life insurance policy has a cash surrender value and this may be borrowed against.

"Surely, it is not difficult to carry over this example to an industrial machine, say, a dynamo or a piece of apparatus like a big fractionating column. Almost always the makers give the buyer some sort of a guarantee. A property-life insurance policy makes that a blanket and perpetual guarantee, and at the same time takes care of replacement either because the equipment has worn out or become out-moded by improvement, by new process, or by change in demand that makes it no longer profitable to make the goods produced by that machine.

"From the individual dynamo or still, the very same principle can be, and is, extended to a whole plant, to an office building, to a home, to a ship, indeed to any kind of property. You see," he added, smiling again his Gargantuan grin, "it is all very simple.

"But," he added quickly and becoming quite serious, "it was not so simple to work out in the first place; and in the long run, its effects are distinctly important; I even make bold to say, of nearly supreme importance in the United States today for such a group as the chemical industry."

"That," I put in, "is just what the readers of CHEMICAL INDUSTRIES want to know from you—how

and why will property-life insurance be of use to the chemical manufacturer?"

He replied very deliberately, carefully picking just the right word, "When we first worked out in a practical way this idea of property-life insurance, we collected literally thousands of definite facts on the depreciation and obsolescence of hundreds of different individual goods—roofs, for example, and all varieties of machines for all sorts of purposes and used under all kinds of conditions. In this way we were able to work out "life tables" for all sorts of machines and buildings. Our earliest policies were quite specialized, based on special pooling of types. Next we broadened the policies by setting up risk classes. Now we have one policy for a whole industry, with some special subclasses for special machines. We insure against what the plant man would call repairs and maintenance, not against painting or polishing; but to keep the machine or building or ship in running order, covering also accidents that prevent the property from performing its economic duty. We make no distinction between defects in materials or faults in construction. At the end there is available a loan for replacement which represents the difference between the scrap value of the old property and the cost of the new which will replace it.

"Property-life insurance is, you see, neither complicated nor fantastic; and in the case of the chemical industry it offers a very simple solution for a most fundamental risk, namely, the grave danger of dissipating capital in any field where depreciation is high and obsolescence rapid.

German Statistics of Obsolescence

"Our statistics show that with the exception of the electrical and the automotive industries obsolescence is greater in chemical manufacturing than in any other field; and upon a basis of strict technological improvement, chemical obsolescence is fastest of all since the element of style has a far greater effect in the electrical and automobile industries. As for depreciation, chemical operations very often—how do you put it?—chemical operations literally eat up, consume, destroy very expensive apparatus. When using the newer technique of reactions in the gaseous state under high pressures and at high temperatures, which I believe was first perfected in Germany, the rate of depreciation is substantially increased. Therefore, our foresighted and financially strong chemical companies insure their apparatus a life span of from three to five years.

"What is the cost? That depends upon the type of apparatus and the kind of chemical service it is performing. Naturally, the more promptly renewals or replacement must be provided against, the higher the premium rate. But these companies are in effect earmarking funds in order to keep their plants not only at perfect operating efficiency, but also up to the highest competitive standards against improvements in the design or materials of the apparatus itself or against a more modern process. These funds in property-life

insurance premiums are considered legitimate running expenses.

"Conservation of capital is already a world-wide problem. The expenses of all governments for armament, for social purposes, for administration, are mounting fast. Your new tax on the undivided surpluses of corporations has brought to your own doorstep what it means to meet rising deficits in government finance. In some European countries taxes on corporation profits are as high as forty per cent. and even sixty per cent. on personal incomes. Such taxes, as you will quickly discover, make it almost impossible to conserve capital. Yet even these exorbitant tax levies are not always sufficient to meet rising governmental expenses, and then, as has been proved in several countries, attack is made upon capital itself.

"Experienced officials in countries where the aim, hidden or open, is not so to cripple industry that some form of socialization of industry will become necessary, are beginning to realize that if the economic system of individual initiative and individual responsibility—your own American system—is to be preserved, then private enterprise must have some security against depreciation and obsolescence. Some means must be found of preserving and keeping up-to-date the nation's tools of production. Provision must be made for their repair, renewal, and eventual replacement lest the source of all wealth will be dried up."

Carbon Black Operations '35

The carbon-black industry, which had made marked progress in '34, enjoyed a profitable year in '35, states the Bureau of Mines. Production was 352,749,000 pounds, exceeded only by the totals of '29 (366,442,000 pounds) and '30 (379,924,000 pounds). Demand reached a new peak, the total of domestic and export sales being 387,536,000 pounds, compared with the previous record of 374,468,000 pounds in '33. Stocks at the plants were materially reduced in '35, only 136,086,000 pounds, or a little more than four months' supply, being on hand December 31, compared with 171,799,000 pounds at the beginning of the year. The increase in prices, which occurred about the beginning of '34, was maintained in '35, the average value at the plants being 3.90 cents, compared with 3.54 cents in '34.

Production of carbon black outside of the Texas Panhandle decreased slightly in '35, hence the center of the industry moved nearer to the Texas Panhandle. The output in Louisiana declined from 66,538,000 pounds in '34 to 64,875,000 pounds in '35; this was probably due to curtailment in available supplies of natural gas due to increased pipe-line requirements. Production in the Texas Panhandle rose to a new record of 263,361,000 pounds, an increase of 11% over '34. Two new plants were operated in the Panhandle during '35.

There were 241,589,000,000 cubic feet of natural gas burned in the manufacture of carbon black last year, compared with 229,933,000,000 cubic feet in '34. The '35 figure was equivalent to about 13% of the total consumption of natural gas in that year. The average yield of carbon black in '35 was 1.46 pounds per thousand cubic feet, compared with 1.43 pounds in '34.

Carbon black sales by manufacturers to brokers and consumers in '35 totaled 387,536,000 pounds, of which 245,351,000 pounds (63%) was consigned to domestic buyers and 142,185,000 pounds (37%) was exported. Of the domestic deliveries, 213,708,000 pounds (87%) was consigned to rubber companies, 15,177,000 pounds (6%) to ink companies, 6,550,000 pounds

(3%) to paint and varnish companies, and 9,916,000 pounds (4%) to companies producing miscellaneous products. Compared with '34, these data indicate increases in the percentages utilized in rubber and miscellaneous products, virtually offset by a decline in the percentage utilized in ink. The increase in sales of carbon black to rubber companies in '35 reflects a gain of 10% in consumption of rubber, including both crude rubber and reclaimed rubber.

Exports of carbon black totaled 142,185,000 pounds in '35, an increase of 18% over '34. The United Kingdom continued to be the leading customer, but Germany displaced France in second place. The total value of carbon black exports in '35 was \$6,673,000, an average of 4.69 cents per pound, compared with an average of 4.59 cents in '34.

The primary statistics of the carbon-black industry in '34 and '35 were as follows:

	1934	1935
Number of producers reporting	25	21
Number of plants	50	54
Quantity produced (pounds):		
Louisiana	66,538,000	64,875,000
Texas:		
Breckenridge	*24,887,000	*24,513,000
Panhandle	237,403,000	263,361,000
Total Texas	*262,290,000	*287,874,000
Other States	(*)	(*)
Total	328,828,000	352,749,000
Produced by:		
Channel process (pounds)	293,546,000	316,284,000
Other processes† (pounds)	35,282,000	36,465,000
Stocks held by producers Dec. 31 (pounds)	171,799,000	136,086,000
Sales (pounds):		
Domestic:		
To rubber companies	165,446,000	213,708,000
To ink companies	16,146,000	15,177,000
To paint companies	5,365,000	6,550,000
To miscellaneous companies ..	5,035,000	9,916,000
Total	191,992,000	245,351,000
Exports:		
United Kingdom	37,697,000	38,982,000
France	22,726,000	19,000,000
Germany	16,499,000	23,106,000
Other	43,698,000	61,097,000
Total	120,620,000	142,185,000
Losses (pounds)	386,000	926,000
Value (at plants) of carbon black produced:		
Total (dollars)	11,654,000	13,755,000
Average per pound (cents)....	3.54	3.90
Estimated quantity of natural gas used (M cubic feet)	229,933,000	241,589,000
Average yield per M cubic feet (pounds)	1.43	1.46

* Oklahoma and Wyoming included with Breckenridge district.
† Roller, "special", thermatomic, and Lewis.

W. P. A. Aids Research on U. S. Imports

"Chemicals and Related Products" is the title of a volume just issued by the U. S. Tariff Commission. It is Volume X, of "Comparative Statistics of Imports into the U. S. for Consumption by Countries for the Years 1931-35," the statistics having been compiled as a Works Progress Administration project at Richmond, Va., under the supervision of the Tariff Commission.

It is one of eleven volumes covering the whole range of U. S. imports and is the sixth so far issued. Others are expected to be completed by November 1. The project when completed will have involved the decoding of more than 4,500 statistical classifications for each of the years covered and will include every article specified in the Tariff Act of 1930.

Coal-tar Chemicals

"Act Up"

By Walter J. Murphy

A MODEL of price deportment during the worst of the depression, several coal-tar chemicals, notably crude naphthalene and cresylic acid, have in the past eight months become "problem" cases.

Members of this group are chiefly byproducts of the coke industry; and, since normally 75 per cent. of the byproduct coke produced is utilized by the pig iron industry, a definite balance exists between coal-tar chemicals and the iron and steel industries.

This intimate relationship is a mixed blessing. In 1932 when pig-iron output was but one-fifth that of 1929 and coke production was about one-third of the boom year record, there was no appreciable accumulation of byproducts, although the industries using coal-tar chemicals also reached abnormally low levels of activity. Whether by design or not, the Roosevelt Administration first deliberately lent greater assistance to the consumer industries than to the durable goods industries, resulting in a definite lag in pig iron production through 1932-1934. Thus through the major part of the depression coal-tar chemical prices were firm.

With greater industrial activity demand for several coal-tar chemicals has been so great as to cause shortages in solvent naphtha, toluol, xylol, cresylic, and naphthalene with a gradual tightening of prices and precipitous rises in certain individual instances.

Outstanding are the changes in the market for naphthalene. Imports have exceeded domestic production in 1932, 1933, and 1934 (see Chart I). In each of these years Germany was by far the largest source of supply (Table I), and the consternation of consumers is understandable when early in the current year an embargo by Germany was declared on exports of crude. Quotations soared from \$2.00-\$2.50 per 100-pounds to well above \$4.00 and finally became largely nominal. Time increased the difficulties, for the embargo came in the spring when the repackagers for the moth-prevention trade are most active. Why did Germany voluntarily forego profitable exportations (16,000 tons in 1934, 10,000 tons in 1935 and but 1,583 tons in the first four months of 1936) of naphthalene? A desire for self-sufficiency in all raw materials is the chief reason. Unfavorable trade balances, difficulties of exchange, and ever increasing tariff barriers are others. In the latter part of last year the discovery of "Alcydal," an ingredient in a linseed oil substitute called "El-Varnish," was announced. Naphthalene is one of the raw materials. Now comes the development of a process for the manufacture of

carbon black in which naphthalene is the starting point. We have a double-barrelled situation—no supplies of crude naphthalene from Germany and the possible, if not probable, loss of our carbon black sales to the Reich, which in 1934 amounted to 16,499,442 pounds valued at \$706,348, and which, according to preliminary figures reached in 1935 a new all-time high peak: 23,106,000 pounds. Germany has consistently been our third best customer following the United Kingdom and France.

I. G. chemists have made carbon black, suitable for the rubber and printing ink fields, from polynuclear aromatic hydrocarbons and compounds or their derivatives or hydrogenation products, such as naphthalene, methyl naphthalene, tetrahydronaphthalene, phenanthrene or anthracene, by decomposing these hydrocarbons in the presence of catalysts having a dehydro-tures not below 300 deg. C. and regulating the flow of heat so that the carbon black formed is not exposed to temperatures above 500 deg. C. for long periods of time. The English patent on the process (No. 363,735) cites one example where 100 parts of purified naphthalene are heated in a rotary autoclave with 10 parts of finely divided nickel, to which sodium hydroxide has been added, at from 450 deg. C. to 480 deg. C., until the pressure no longer increases. The catalyst is removed from the carbon black by treating it with dilute acid. The physical and chemical properties of the carbon black are said to be highly satisfactory and the yield excellent.²

Whether process costs compete with U. S. export carbon black prices is only an academic question if Germany intends to be self-sufficient; outside of Germany it threatens the American carbon black industry, and challenges American producers to improve present operating efficiencies which are notoriously low. Sorely needing exports to establish gold credits, the German Government must be confident that the process is feasible to have consented to a naphthalene embargo and to have decreed that the consuming industries admix 20 per cent. of the new black with imported material. While the reports from abroad of the new

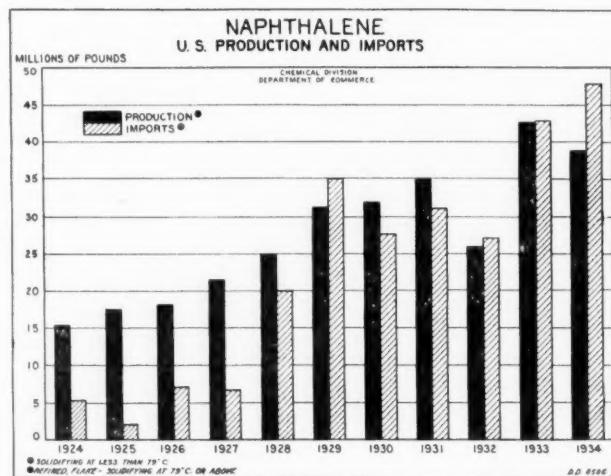


Chart I.

Table No. 1*—U. S. Imports of Naphthalene† for Consumption by Countries

Country	1931		1932		1933		1934		1935 (Preliminary)	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Total	30,971,097	\$318,578	27,002,268	\$234,557	42,786,368	\$451,019	47,994,513	\$669,383	48,454,854	\$643,249
Belgium	252,982	2,506	.....	.....	4,970,324	57,243	7,313,870	90,424	2,387,931	31,375
Czechoslovakia .....	.....	.....	.....	.....	.....	.....	2,984,454	44,371	6,959,999	98,099
France	666,660	6,074	600,868	6,531	.....	.....	.....	.....	.....	.....
Germany	17,444,446	170,463	16,510,411	150,930	20,796,609	242,501	22,219,291	326,607	15,742,094	230,820
Irish Free State .....	.....	.....	.....	.....	.....	.....	.....	.....	22,326	171
Netherlands	936,921	11,837	.....	.....	1,092,079	12,693	620,569	8,739	1,344,188	19,724
Poland and Danzig .....	.....	.....	.....	.....	.....	.....	5,765,530	89,002	5,075,454	63,992
U. S. S. R. (In Europe)‡	.....	.....	.....	.....	.....	.....	1,049,831	12,569	6,157,857	74,354
United Kingdom	11,338,592	123,890	9,286,052	71,367	15,704,056	135,853	6,968,213	78,968	10,688,612	123,545
Canada	331,496	3,808	604,937	5,729	223,300	2,729	1,072,755	18,703	76,393	1,169

* U. S. Tariff Commission—Comparative Statistics of Imports Into the U. S. for Consumption by Countries for the Calendar Years 1931-1935 Inclusive, W. P. A. Statistical Project 65-31-2075.

† Naphthalene solidifying at less than 79° C.; free of import duty.

‡ Classified as U. S. S. R. (in Europe and Asia) in 1935.

process stated that the yield is excellent, no exact figures are available that indicate the quantity of naphthalene required to produce a pound of carbon black. Whether sufficient surpluses of naphthalene are available in Germany and other countries where the process might be introduced, over and above the quantities needed for other purposes, to give complete independence of American carbon blacks, is an open question.

So far the shortage of crude naphthalene has been more apparent than real. Our 1935 imports (Table 1) were larger than for any other year in the '31-'35 period although importations from Germany declined by about a third from the high point reached in 1934. The loss from Germany was more than made up by heavy increases from Czechoslovakia, the Netherlands, the U. S. S. R., and the United Kingdom. Similar conditions prevail so far this year, according to preliminary figures; but it is problematical whether these countries can continue to make good the German loss. A reliable authority, recently returned from a European tour of inspection, reports that but negligible quantities are available in Czechoslovakia. That country exported to the United States nearly seven million pounds in 1935!

Fortunately for domestic consumers adequate supplies are not as hopeless as the foreign situation implies. American producers are increasing considerably the output of crude in the coming year. The potential supply of crude from byproduct coke oven operations is believed to approximate 117,000,000 pounds annually, more than sufficient for domestic requirements.

Domestic producers, during depression years, hesitated to increase productive capacity materially for excellent reasons. First: Germany, the United King-

dom, and several other continental countries have had heavy exportable surpluses and, with the crude admissible duty free, ruinous foreign competition was real. Second: the difficulty of disposing of the heavy products of tar refining, such as pitch and creosote. Expansion in building now offers a better opportunity to dispose of larger quantities of these products and improved demand is reported for certain of the tar acids.

Phenomenally increased production of phthalic anhydride (employed in dyes and synthetic resins) offers substantial inducement to tar distillers to increase naphthalene output. U. S. phthalic production, under the impetus of the growth of alkyd resins, has risen from approximately 8,000,000 pounds in 1929 (the record high until 1932) to approximately 25,000,000 pounds in 1935,³ and further expansion in these resins and development of other derivatives of phthalic anhydride are reasonable expectations. Assurance of a fairly stable price in the \$2.50 to \$3.00 range may make our naphthalene consumers independent of foreign supplies.

But it is not likely that this millennium can be reached immediately. The 1935 domestic production of crude and refined totalled 47,653,372 pounds as against imports of 48,454,854 pounds of crude. But 1934 domestic production was but 37,922,455 pounds so that the trend is now definitely upward. These totals are to be discounted by the refining in this country of imported crudes, a figure that is unknown even to distillers. However, the byproduct coke industry is recovering. The 1935 total of 34,224,053 tons (Table 3) compares favorably with the depression low of but 21,136,800 tons in 1932, but still is not entirely satis-

Table No. 2—Imports of Cresylic Acid for Consumption by Countries*

Country	1931		1932		1933		1934		1935	
	Gallons†	Value	Gallons	Value	Gallons	Value	Gallons	Value	Gallons	Value
Total	580,833	\$244,631	479,729	\$164,379	649,851	\$178,824	842,766	\$284,051	805,778	\$265,485
France .....	.....	.....	.....	.....	.....	.....	2,080	799	.....	.....
Germany	126,293	51,643	53,380	14,360	42,004	8,666	25,643	6,263	11,262	3,325
Netherlands	6,388	2,655	5,279	1,257	2,596	551	.....	.....	.....	.....
United Kingdom	448,152	190,333	421,070	148,762	595,403	165,986	815,043	276,989	794,471	262,137
Canada .....	.....	.....	.....	.....	9,848	3,621	.....	.....	45	23

* Same source as Table No. 1.

† Converted from pounds to gallons at the rate of 8.50 pounds to the gallon.

Table No. 3—Statistics of the By-Product Coke Industry* (Short Tons)

	Coal Charged In By-Product Coke Ovens	By-Product Coke Production				Total	Relationship (%) of Pro- duction to Maxi- mum Capacity at By-Product Plants
		Furnace Plants†	Percentage of Total†	Other Plants†	Percentage of Total†		
1928	70,165,906	38,244,254	79.2	10,068,771	20.8	48,313,025	83.7
1931	46,846,277	20,817,240	64.3	11,538,309	35.7	32,355,549	52.8
1932	31,045,064	11,374,300	53.5	9,762,500	46.5	21,136,800	33.6
1933	38,680,937	16,144,100	60.5	10,534,000	39.5	26,678,100	42.7
1934	44,342,998	19,241,800	62.5	11,550,961	37.5	30,792,761	49.2
1935	49,045,619	23,034,261	67.3	11,189,792	32.7	34,224,053	...

* Data compiled from Annual Reports of the Bureau of Mines.

† Bureau of Mines includes production from city gas plants in figures for "Furnace Plants" so that the above figures are not 100% accurate as an indication of the "ups and downs" of the metallurgical operations and the relationship between the consumption of coke for metallurgical purposes and other uses. Bureau of the Census reported in 1929 and 1931 there were 21 such establishments and the 1931 production was 3,548,818 tons of coke.

factory against the 48,313,025 tons produced in 1928 and 53,411,826 tons in 1929 (Table 3). Most improvement in by-product coke production must follow improved conditions in the metallurgical field, rather than from the introduction of new plants in the highly populated centers, erected for the manufacture of coke for domestic use, for gas for illumination, and for heating purposes. Petroleum is offering severe competition with piped natural gas now in cities far removed from the point of origin.⁴ The latest and perhaps most spectacular change-over takes place in the entire Detroit area November 27th, the gas being piped from Texas and Oklahoma, a distance of 1,100 miles.

The Coal Research Laboratory of Carnegie Institute of Technology⁵ estimates normal production of tar at 700,000,000 gallons, of which 340,000,000 gallons are burned and 360,000,000 gallons refined, the latter in turn supplying the following: creosote oil and tar acids, 150,000,000 gallons; road tars, 100,000,000 gallons; tar pitch, 650,000 tons; and naphthalene 40,000,000 pounds. The relationship between the tar burned and the tar refined can naturally be varied, if the economics involved warrant. The technical trend is to get some value out of the tar before using it as a fuel, and a number of coke plants resort to at least a partial distillation, separating light and middle oils and using the residue for fuel purposes. Increased output of coal-tar chemicals by coke producer-distillers at the expense of purchaser-distillers will also likely continue. In other words coke producers are giving greater attention to byproducts. However, this statement must not be taken too literally. Many of the coke producers are satisfied with the arrangement whereby distillation specialists handle the chemical production. It is but a few weeks ago that announcement was made of the Reilly Tar & Chemical Corporation's new plant in Cleveland, close to the Corrigan-McKinney Works of Republic Steel.

Cresylic Acid Prices Are Above 1929 Levels

Cresylic acid is analogous to naphthalene in two particulars; both have had sharp price increases during the current year, and the growth of synthetic resins has increased the consumption of both materials. A third analogy can be drawn, our dependence on foreign

sources of supply (Table 2). The 1933 import and domestic production figures indicated that imports totalled 5,523,733 pounds and domestic manufacture 13,813,941 pounds or in round figures we were dependent upon foreign sources for about a fifth of our consumption, the largest share coming from Great Britain. Great Britain's supremacy in the international cresylic market is credited to the peculiar properties of Welsh coal with higher yields than from American coals.

Domestic and imported cresylic acid have been difficult to obtain in the past eight months. Quotations (at times nominal) have risen on the 97-99% pale grade from 51 cents on January first to 73 cents for domestic and 79 cents for imported. Cresylic has been notorious in many periods for wide price fluctuations, caused, in most cases, by the sudden introduction of new uses or the abandonment of old ones.

References:

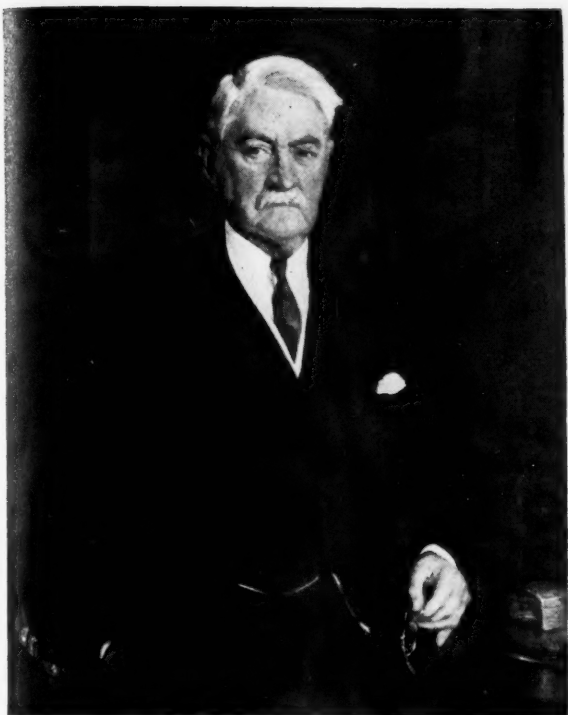
1. Comparative Statistics of the Imports into the U. S. for Consumption by Countries, for the Calendar Years 1931-1935 Inclusive. W.P.A. Statistical Project 65-31-2075, Vol. X, Group 8—Chemicals and Related Products.
2. The Chemical Trade Journal and Chemical Engineer, British, Aug. 28, 1936, p170.
3. Phthalic Anhydride, C. R. Caryl, Chemical Industries, May, '36, p461.
4. Gas, entire issue for September, '36.
5. Industrial & Engineering Chemistry, Vol. 13, No. 9, May 10, '35, News Edition.

Suggestions In Increasing Plant Safety

Mental rehearsals of emergencies should share importance with physical rehearsals of safety drills and life saving in the routine of every chemical worker, John S. Shaw, Manager, safety service dept., Hercules Powder, stated at the Chemical Session of the 25th National Safety Congress and Exposition held at Atlantic City. Each day the worker should imagine emergencies to arise and mentally rehearse what he would do if this, that or the other thing should go wrong, the speaker declared.

"This 'brain exercise' is very important in the training of the chemical worker and not only does it lead to a broader knowledge and appreciation of his job, resulting in safer and more efficient operations, but often-times has a direct bearing upon the creative impulse, resulting in improvements and inventions," Mr. Shaw asserted.

In times of emergency every man should do all he can to save life and property and when he has done this, he should save his own life, the speaker stated. "There is no need to risk your life by staying too long in a dangerous spot."



Pioneer Maker of Coal-tar Chemicals

With a slashing stroke of wit he broke the thin ice which the chairman had so skillfully avoided and plunged in. Very quietly, very briefly, in telling phrases he pointed out the grave public responsibilities of every surveyor of medicines. "When it is a question of life or death," he said, "there can then be no question of quality or profit." He named names and quoted prices to show the many subtle varieties of sophistication that were common in those days. His sarcasm seared the opponents of a law designed to prevent such abuses. "This law is proposed for the protection of the public," he concluded, "but believe me, gentlemen, it will be a God-send to every honest maker, every honest seller of medicinal products."

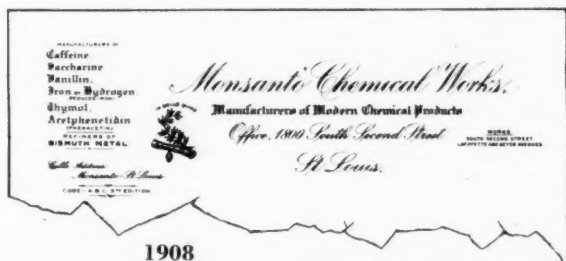
So vigorous a report, delivered so fervently, by a man known to everyone, a man whose personal integrity was never questioned, a man who represented the largest wholesale drug house in America, had profound and immediate effects. It marked the first turning of the tide of sentiment in the chemical and drug field towards the Pure Food and Drugs Act, and it was this support within the trade that eventually carried the measure through both House and Senate.

Yet when John F. Queeny stood up to make that famous minority report of his, he faced an hostile audience. For an employee, even as trusted a man as he in as responsible a position as he held, this was a courageous thing to do. He was thinking far ahead of his time, for what his contemporaries could at first see only as a restrictive law, he conceived truly to be a constructive measure for the benefit of his business. His earnest sincerity, supported ably by his most winning personality, enabled his convictions to triumph over the misgivings and the opposition of his peers. It was an experience that was repeated time after time in the career of this pioneer maker of coal-tar chemicals in America.

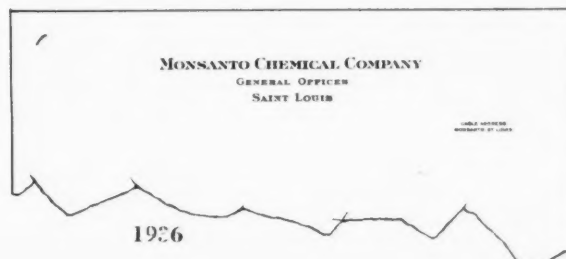
Of all that sturdy band of rugged individualists who during the past century founded our great American chemical companies, none was so incorrigible an independent, so indomitable a fighter as John Francis Queeny, founder of the Monsanto Chemical Company.

AT the insistent instigation of an enthusiastic young chemist in the Department of Agriculture a new kind of law had been introduced into Congress. It made the revolutionary proposal that definite standards, with tests for purity, be set up for all sorts of medicinal chemicals and drugs, and it provided that sellers of adulterated or sub-standard materials were to be punished by fine or imprisonment.

Even the most responsible people in the drug trade, men and firms of highest probity, sincerely believed that this proposed Pure Food and Drugs Act was a dangerous and unwarranted extension of governmental powers. They indicated politely, but pointedly, that Harvey Wiley, its sponsor, was a crack-brained visionary. Important technical and professional societies solemnly resolved that such legislation was an invasion of the rights of citizens. Powerful trade associations worked against the law in Washington. The conservative and influential National Association of Wholesale Druggists, after a short, hot debate, referred the matter to its standing committee on trade practices. The diplomatic chairman of that committee, in his report at the meeting the following year, glossed over this inflammable subject of the Pure Food Bill. One member of his committee, however, the director of purchases of the Meyer Brothers Drug Company of St. Louis, felt strongly for this revolutionary law, and he had the courage of his convictions. John F. Queeny read a minority report.



1908



1926

With his background of experience and acquaintance in the wholesale drug trade, it was not unnatural, when he determined to become a chemical manufacturer, that he should select the fine and medicinal products of coal-tar origin. He must have been aware of the technical difficulties involved in the manufacture of this complex group. He knew perfectly well that this was the chemical domain which the powerful German companies had made their own and which they were determined to dominate. As a buyer he was quite familiar with the ruthless methods they had long successfully employed to prevent the establishment in this country of any domestic production of coal-tar dyes, coal-tar aromatics, and coal-tar medicinals. He had first-hand information on the comparatively limited market for the chemicals he proposed to produce; and he was amply forewarned of the negative, but stubborn sales resistance which any newcomer would meet in this comparatively new medicinal field due to exacting demands for purity and the extreme conservatism of buyers. It would almost seem that Mr. Queeny had deliberately picked out the most difficult of all chemical fields and the one in which success, even under the most favorable circumstances, would be longest delayed. Courage was one of his most outstanding characteristics.

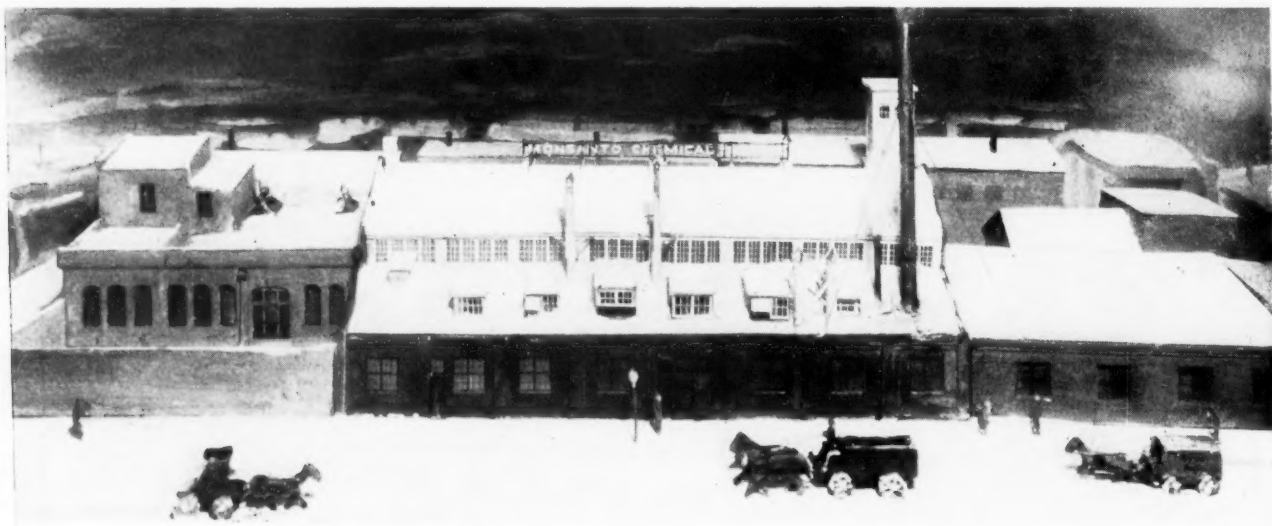
He needed great courage, and all of his great perseverance as well, for he met every obstacle which his experience and foresight had anticipated with some altogether unexpected set-backs. Literally, he battled his way ahead. For when most thickly beset with difficulties and discouragements, his plan of campaign was always founded upon an aggressive offensive. He refused to compromise, even when he might so have won a snugly entrenched position, if compromise meant any sacrifice of his independence. First and last, he was an industrial warrior who never recognized defeat.

During his lifetime, among those who did not know him well enough to penetrate beneath external superficialities, he had the reputation of being impulsive and swayed too greatly by his personal likes and dislikes.

Apparently this was so, because his decisions were made with the speed and finality of a thunderbolt while his personal friendships were as firm as his commercial rivalries were uncompromising. Furthermore, he was an exceeding human individualist, with a hearty personality; open-hearted and open-handed; outspoken even to the point of brutal frankness. He hid nothing, for he had nothing to hide since neither deceit nor trickery entered into his make-up.

Nevertheless John F. Queeny worked for long years upon the well thought-out pattern of building the Monsanto Chemical Company upon the foundation of coal-tar intermediates produced by themselves from American crudes. Today his oldest associates in that enterprise cannot recall a single important chemical which once made was subsequently discontinued. In several instances they made materials before the market here was ready for them; but invariably John Queeny's foresight was in time justified. At the close of the World War, when the Monsanto interest was bought into the coal-tar plant in Wales, the objective was to acquire a British contact with world markets. This he clearly observed was closer and more practical than any American chemical house might expect to make in many years, and he anticipated that such a contact would be a powerful weapon to keep the German manufacturers from regaining a stranglehold upon international chemical trade. No capricious executive reasons in this fashion nor leaves such a record of persistent accomplishment. In fact, the sinewy virtue of persistence was perhaps his most distinguishing attribute.

As a young boy John Queeny was suddenly confronted with a sink-or-swim crisis. If that little lad of twelve had not been born with self-reliance and tenacity, no other gifts of nature would have brought him safe to harbor in the port of success. His father was a wealthy, retired contractor, and John Francis was the eldest of five little Queenys. He had just finished grammar school and little thought had been given to his future for apparently he had before him



Original Saint Louis plant of Monsanto Chemical Company.



The present Saint Louis plant.

eight or ten years of school and college. This pleasant, indefinite program was turned to ashes in the Chicago fire. In that conflagration his father's comfortable fortune vanished. Young John Queeny must go to work.

Chicago business was thoroughly disorganized. Good jobs were not easy to find. It was not, therefore, the romance of pharmacy, nor the lure of chemistry, nor even a burning ambition to become a great chemical industrialist, which started John Queeny upon his career at eight o'clock on the morning of March 28, 1872, in the wholesale drug house of Tolman & King. It was simply an accident, for as he himself delighted to relate: "I took my first job as an office boy in a drug concern at \$2.50 a week, just because it was the first one I happened to run across."

From office boy young Queeny graduated into a "runner for shorts," an arduous occupation in the pursuit of which he drove a light express wagon about the Chicago Loop, going from one wholesale druggist to another, collecting a twelfth of a dozen of Jones Cough Mixture; a half dozen bundles of licorice root, or whatever odds and ends his house needed to fill that day's orders.

It is a tradition of the Chicago drug trade that young John Queeny could make the rounds over to Kinzie Street, on to West Washington, and back to Wabash Avenue in a record time that has not been lowered in these days of motorcycle delivery. Years later when this early honor was unexpectedly thrust upon him at a banquet, he confessed with glee, "Oh, that was easy. I knew all the traffic cops, and they gave me the breaks at the corners. Besides I wore out more tires—iron ones, not rubber—than any other boy on the job."

Tolman & King were succeeded by John A. King & Company, whom Morris & Plummer later bought out. Young Queeny survived these changes in ownership, and in eleven years had worked up from office boy at \$2.50 a week to a desk in the city sales department at \$18. Then he was offered the position of buyer for I. L. Lyons & Company in New Orleans. Here he spent the next ten years, going thence to St. Louis in a similar position with Meyer Brothers Drug Company. Save for a three-year interlude when he was in New

York with Merck & Company, he remained with Meyer Brothers until he became a chemical manufacturer in his own right.

In 1899, three years after his final return to St. Louis, Mr. Queeny fared forth on his first chemical manufacturing venture. It was an exceedingly inauspicious beginning. Had it been successful, it is not unlikely that today the Queeny name would be associated with heavy chemicals and the birth of the American manufacture of synthetic organic chemicals might conceivably have been postponed, as it was in the case of dyes, till the period of the World War. For John Queeny's first chemical enterprise was the refining of sulfur.

From his position as buyer for Meyer Brothers, he logically deduced that since St. Louis was the heart of the industrial Middle West, low-cost freight from the then newly developed sulfur mines of Louisiana made this the focal point for the refining of this material. He outlined his plans to the head of the house of Meyer and received his consent to conduct, under a paid manager, a sulfur refinery in East St. Louis while still retaining his position as head of their important purchasing department.

Accordingly, the manager was engaged, a building across the river rented, machinery installed, and in due course, six cars of crude sulfur were shunted alongside. By this time Mr. Queeny found that he had paid out nearly all of his six thousand dollars of savings.

At last the eagerly awaited day when the new plant was to come into operation arrived. A direct wire had been installed at Mr. Queeny's desk and all afternoon he impatiently awaited word that production was actually under way. Five o'clock came and no call on the plant telephone. Half past five, still no message. At a few moments before six, the call bell rang; but it was the regular telephone not the plant wire. In breathless phrases the manager blurted out his message.

"Fire! . . . Sulfur ignited in the conveyor system. . . . Nothing left but the concrete foundations."

Mr. Queeny thanked him and slowly hung up the receiver. Hardly had it slipped onto its hook when again the bell rang. It was Mrs. Queeny.

"John, dear," she said, "have you forgotten that we have guests coming for dinner at seven?"



Mr. Queeny was one of the first Americans to popularize the Kerry Blue terrier.

Man-like, of course, he had forgotten, but he remembered in a flash that this was to be a party that his wife had been keenly anticipating and he instantly rose to a very un-man-like sacrifice.

"I'm just leaving the office. I was waiting for word from the plant."

"How is everything? Did they get going?"

"Everything's fine. They got going about four o'clock—going like a house afire!" and he chuckled at his grim little joke. That evening he outdid himself in the congenial rôle of the entertaining and hospitable husband of a gracious hostess. Not till the next morning did he break the news of the fire that had wiped out their savings and blasted his hopes.

Like that earlier fire which by chance had driven him into the drug business, this second one did not wither his courage; and two years later, in 1901, when his savings had accumulated to a very modest sixteen hundred dollars, John F. Queeny ventured again into the manufacture of chemicals. In two important respects, however, this second chemical-making endeavor differed from his initial effort. To facilitate raising outside working capital he formed a company, choosing for its corporate title his wife's family name of Monsanto. He set out not to refine an old and important industrial raw material, but to produce one of the newest of the coal-tar group of fine chemicals.

The development of this group and its unbounded future possibilities fascinated John Queeny. He had witnessed the introduction of aspirin and phenacetin and noted their sensational successes from both the

therapeutic and commercial points of view. His interest in the Pure Food and Drugs Act had prompted a special study of methyl salicylate, synthetic oil of wintergreen. When saccharin was introduced, almost coincident with the early development of the soft drink business in this country, he sensed a real opportunity, and he promptly went to his employers to point this out and to urge them to enter chemical manufacturing in this field. Such a proposal was contrary to every tradition of the house; but again permission was given to the chief buyer to engage in this business venture on his own time outside of office hours.

The saccharin market in this country was tightly in the grasp of the German manufacturers, so arrangements were made with the Swiss firm of Sandoz to supply the necessary intermediates and through their good offices a young Swiss chemist came over to America to take charge of the manufacturing operations. Thus Dr. Louis Veillon joined John Queeny at the very birth of the Monsanto Chemical Company. Theirs was a long, close, intimate association, broken only by death; and of each it is said that he trusted and relied upon the other as upon no other man. One of Mr. Queeny's strongest points as an executive was his unwavering confidence in certain key men of the technical staff. No chemist himself, he devoted his energies and intelligence wholeheartedly to sales and general administration, relying implicitly first upon Veillon, and later as the organization grew, upon Gaston Du Bois and Jules Bebie, H. O. McDonough and Lloyd Francis Nickell. Nothing could shake his faith in these men; and this well placed confidence, together with his infectious conviction of success were undoubtedly important elements in the long up-hill struggle to establish coal-tar chemical manufacturing in the United States.

Assured of a process, of raw materials, and a competent production man, John Queeny set out to secure working capital and a plant. The start was made in what was little more than a glorified shed with an oil stove as the chief piece of equipment. Mr. Queeny furnished \$3500 of the capital, his friend John Ros-siter, \$500, and Jacob Bauer of Chicago, president of the Liquid Carbonic Company, manufacturers of soda fountains and syrups, \$2000. Two years later, in 1903, Thomas Wright bought a substantial minority interest in the young concern, investing \$25,000, and his son Ralph Wright joined the staff in the sales office.

In the spring of that same year, Mr. Queeny made his first trip to Europe. He sought personal contact with the Sandoz people and was on the lookout for other products and processes that might be added to the manufacture of saccharin. Arrangements were made for a young Swiss chemist, Gaston Du Bois, to act as interpreter for him. They met on the docks at Rotterdam, and Mr. Queeny promptly turned over all his cash to his youthful guide with instructions to take him to the best hotel and to pay all his expenses. Swiss

frugality triumphed over these blanket instructions, and they went to what Mr. Du Bois describes as "a very good, but not very expensive inn."

For three weeks they were together day and night, and John Queeny was so won by the character and ability of Gaston Du Bois that he persuaded him to come back to St. Louis with him "to visit the great St. Louis Fair and incidentally to work out and install a process for making vanillin." The arrangement worked out perfectly, save only that Gaston Du Bois became so deeply immersed in the vanillin problem that he only visited the Fair for a few hours the evening of July Fourth. All the staff was working days, nights, and often Sundays. Mr. Queeny was carrying the double load of his work at Meyer Brothers and overtime in the Monsanto business, and at this time was drawing one hundred dollars a month for the responsibilities of finances which were serious, and of sales which were difficult.

Early Difficulties in Vanillin

Production of vanillin, the most important of all the aromatic chemicals, proved to be a problem indeed, for the yields obtained in the laboratory fell off woefully in the plant. For three or four batches everything would proceed as scheduled. Then suddenly the yield would mysteriously drop. The money invested in research and apparatus was a serious item in the tiny budget of the young company. But Gaston Du Bois had won his confidence and Mr. Queeny's sole comment was: "Suppose you write out a full report, comparing each step of the laboratory and the plant operations. Then let's see what is to be done next." "What next?" came to be his invariable reaction to any check in their technical development.

In the meantime, saccharin was well in production; but ruthless competition from the Germans was raising a real crop of problems in John Queeny's own department of selling. The price had been slashed from \$6 a pound to \$3—eventually it was cut down to 60c—and more than this two other American makers, Heyden and Fries Brothers, had entered the lists under the German auspices. This domestic competition appeared in vanillin also, for Maywood, enjoying favorable German connections, soon began production. Monsanto, it was evident, would be choked to death, unless other products were added, and so after vanillin came (roughly in this order) chloral hydrate, caffeine, glycerophosphates, phenolphthalein, coumarin, acetphenetidin, salicylic acid, acetylsalicylic acid, and the various salicylates.

Every new product meant a repetition of the same merciless battle for the trade. For example, before Monsanto began making chloral hydrate the price had been 85c. Finding his costs well below this figure, John Queeny decided to set the competitive pace by announcing a reduction to 60c. Thereupon the imported material was promptly reduced to 18c or below

actual factory costs. Monsanto withdrew from the market temporarily and the price was promptly put back to 50c.

Diversification of products saved the day, but Mr. Queeny early recognized that so long as the company was dependent upon foreign sources of supply for intermediates no real stability could be won and it would continue to be vulnerable at a vital point. Accordingly, he brought over the third of the triumvirate of Swiss technical men who share with him in the triumph of successfully transplanting to the United States the seeds of our coal-tar chemical industry. Dr. Jules Bebie was engaged specifically to make toluene sulfonamid. He did so successfully. Thus, when the World War came a few years later, Monsanto was in the unique position among American saccharin producers of being able to manufacture in their own plant from the raw material to finished goods. With the War came also the shutting off of chemical supplies from Germany, upon which other makers in this country were accustomed to rely, and at the same time the cutting down of sugar supplies, so that the saccharin prices went sailing.

Like others among our chemical pioneers John F. Queeny believed in the letter of a contract. Therefore he fulfilled his obligations to the last delivery order, and while speculators were making fortunes, he endeavored to hold prices down for the benefit of his regular customers. It is an interesting commentary upon human nature that it was the tobacco people, who before the War were the first to support him as an American producer of both saccharin and vanillin, were also, after the War, among the most loyal customers.

War Expansion in Coal Tars

Naturally the period of the World War was a time of great activity and important expansion for Monsanto. The company was the only American-owned-and-operated producing unit in the field of coal-tar medicinals. Their experience was not only invaluable to their own development, but they were also an important aid to the Government in securing needed supplies of both finished medicines and raw materials for the making of dyes and explosives. One good example of the chemical services rendered is furnished by the manufacture of phthalic anhydride, which had been previously imported from Europe for the manufacture of phenolphthalein. On the outbreak of hostilities, Mr. Queeny immediately bought by cable all the available supplies that could be found around the world including 900 pounds found in Japan, some of it in one ounce tins. This but postponed the crisis in manufacture, and work was immediately begun on the old, rather unsatisfactory process of making phthalic anhydride by the oxidation of naphthalene in the presence of sulfuric acid and mercury. When the Government announced the perfection of the Gibbs process by

the direct air oxidation, Monsanto was ready to translate the laboratory reaction into commercial production.

Mr. Queeny had the solid satisfaction of seeing the company he had founded emerge from the War in the position of being essentially a self-contained chemical manufactory. In 1917, the Commercial Acid Company plant in East St. Louis was purchased, making the company independent of outside supplies of sulfuric, muriatic, and nitric acids. The electrolytic production of caustic soda had been established in 1919, giving also adequate supplies of chlorine. Processes had been perfected in the laboratory and carried over to successful plant operation for the production from American coal-tar crudes of all the needed intermediates.

Expansion Following the War Years

Monsanto growth did not stop when the stimulus of war demands was withdrawn. In 1920, with the deliberate intent of securing a place in world trade through the means of a close British connection, a half interest was purchased in the old chemical works of R. Graesser of Ruabon, North Wales. Established in 1867, this plant was the world's largest distiller of natural phenol, and though the original purpose of the alliance was seriously upset by the world-wide depression, nevertheless, Monsanto has since taken over complete control and is now manufacturing most items of its regular line in Britain. Since the War these have been augmented chiefly by the addition of a series of medicinal and rubber chemicals.

Since the War too, expansion by consolidation has been carried forward in other directions. This program was initiated by Mr. Queeny and before his death in 1933, the Merrimac Chemical Company, oldest and largest New England maker of standard industrial chemicals and the Rubber Service Laboratories, producers of chemical specialties for the vulcanizing and compounding trade, had all been joined to the Monsanto organization.

Final Years of His Life

These consolidations and the firm establishment of Monsanto in their British branch occupied Mr. Queeny during the closing years of his life. He spent much time in England and Wales, for in 1927 his son Edgar had succeeded him as president and taken over the burdens of active management. Few men indeed have rounded out their own careers more completely and with greater inner satisfaction than John F. Queeny was able to do. He saw as an accomplished fact his long cherished ambition of a self-contained, widely diversified Monsanto Chemical Company. Secretly he must have loved a good fight and he had after years of hard commercial battle won a lasting victory. He placed the active control of that great company in the hands of his only son, and he lived to know that those younger hands were firm and capable.

Until within two months of his death on March nineteenth, 1933, Mr. Queeny was active in business.

He was, accordingly, the last survivor of the generation of great chemical individualists, great personal industrialists, executives of that distinctive and independent stamp which are no longer to be found in the close-meshed organizations of our great chemical corporations. His passing, as CHEMICAL INDUSTRIES pointed out at the time, "snapped a link with the colorful and illustrious youth of the American chemical industry."

Industry's Bookshelf

The Monetary Problem—Gold and Silver edited by Ralph Robey, 369 pp., Columbia University Press, \$3.50.

This unusual book contains the final report of a British commission appointed in the 1880's to inquire into relative values of gold and silver, probably the most comprehensive report of its kind ever made. The pertinence of these findings is great and Robey's shrewd editing has pointed the application to our present problems.

Canadian-American Industry by Herbert Marshall, Frank A. Southard, Jr., and Kenneth W. Taylor, 360 pp., Yale University Press, \$3.

A survey of the financial exchange between Canada and our country which largely explains the unique international relationships existing. First of a series which will deal with the varied aspects of the relationship, this volume contents itself with an economic-geographic survey of the area.

Inorganic Chemistry by Niels Bjerrum, 317 pp., Heine-mann, 7s. 6d.

Translated from the Danish, this text is one of the finest modern introductions to chemistry. Bjerrum employs a style of presentation that makes for easy reading.

Elementary Principles in Physical Chemistry by T. J. Webb, 344 pp., Appleton-Century, \$4.

An extremely mathematical text, written for students with less than average mathematical equipment. Special reference is made to the state of equilibrium of chemical reactions and to rate of attainment of equilibrium. Webb outlines a method for computing equilibrium constants from molecular properties that eases considerably for the student one of physical chemistry's toughest problems.

Essentials of Distribution by Paul D. Converse, 588 pp., Prentice-Hall, \$2.80.

A simple study of market distribution by a recognized authority who embraces many varied problems, and though discussion of these is necessarily brief, the general presentation is good.

Annual Survey of American Chemistry edited by Clarence J. West (Vol. X, 1935), 487 pp., Reinhold Publishing, \$5.

This, the tenth annual survey sponsored by the National Academy of Sciences, is at once scientifically sound and industrially important. This collection satisfies that requirement, and is the quickest and surest reference for those who must keep abreast of chemical progress both in scientific and industrial fields.

The Rise of American Oil by Leonard M. Fanning, 221 pp., Harper, \$2.50.

The economic influence of oil is highlighted in this non-technical history. Though written for popular consumption, this book does not avoid the geological, chemical, and engineering background necessary for accuracy.

Platinum

as a

Chemical Raw Material

By Charles Engelhard

President, Baker & Co., Inc.

PLATINUM is closely and definitely connected with human progress as expressed in scientific researches. More correctly we should say "the platinum group" instead of "platinum" since that term will include all six of the closely allied metals known as "the platinum metals." The six platinum metals: platinum, palladium, iridium, rhodium, ruthenium and osmium are really white golds. They are rarer than gold and have most of its characteristics but are in many respects its superior.

The first great platinum deposits were discovered in the Ural Mountains in Russia by Moritz von Engelhard, professor at the University of Dorpat in 1819, the chief platinum mines being owned partly by Prince Demidoff and partly by the Counts of Schuwaloff. These Russian noblemen paid small wages and so at least one-third of the Russian platinum was stolen and brought to the world market by indirect channels. From 1828-1845 the Russian Government issued platinum coins in place of gold but their use was abandoned because (1) platinum looked too much like silver, (2) the platinum price was not stable enough for a means of exchange, and (3) counterfeiters plated the heavy platinum with gold and passed it off as solid gold, the yellow metal at that time being the more valuable of the two.

The firm of Johnson, Matthey & Co., Ltd., of London, England, is the oldest dealer and refiner of platinum, and, under the guidance of John S. Sellon, it was the first to make platinum available to the universities and industry. They were soon followed by Des Moutis and Lemaire in France and in Hanau, Germany, in 1851, by W. C. Heraeus, who was first to introduce platinum to the German industries. The eldest son of W. C. Heraeus—Dr. W. Heraeus—in 1890 married the sister of Charles Engelhard, who at the end of 1891 emigrated to America and established himself as agent for Heraeus in New York. The chief platinum dealers in America at that time were Raynor, Charles F. Croselmire, and Baker & Co., the last being by far the most important. Raynor died, and during the nineties Engelhard sold platinum in America first as agent for Heraeus, and later as agent for the English and French houses as well. He introduced to America large gold-lined platinum vessels (Heraeus Patent) for the chemical industry as well as platinum wire for electric lamps, for artificial teeth, for contact points, as

well as crucibles and dishes for laboratory work. At that time about one-third of the platinum was consumed in Edison lamps and another third as pins for artificial teeth. The use of platinum in jewelry was also making a rapid growth and in addition much platinum was used for photographic purposes.

The price of platinum in the early nineties went down to \$6.00 per troy ounce but quickly jumped to \$25.00 per ounce or more. In the nineties the output of the Russian mines was largely controlled by the European refineries in London, Paris and Hanau, but at the beginning of this century the Compagnie Industrielle de Platine in Paris was formed which took over practically complete control of the Russian mines and subsequently raised the world price gradually from \$23.00 per ounce to \$37.00 per ounce at the time of the opening of the Great War. Since the revolution control of the Russian platinum mines was taken over by the Soviets themselves, and they have since marketed their platinum production in various ways for their own account.

Even before the Great War the Mond Nickel Company, under Dr. Ludwig Mond and his two sons, Sir Alfred Mond (the late Lord Melchett) and Sir Robert Mond, developed the method for complete separation of the platinum metals from their Sudbury ores. The platinum and palladium extracted were first handled by Johnson, Matthey & Co., Ltd., and subsequently, during the war, by the Mond Nickel Co. themselves, but since the end of the war, by Baker & Co., Inc. The Nickel Company's importance as a platinum producer grew rapidly with the increased production of nickel and the development of the electrolytic process of refining. It reached its present outstanding position in its union with the Mond Nickel Co., and through the opening of the Frood mines and the erection of the great Acton Refinery.

In the year 1902 the firm of C. F. Croselmire sold out and from it the American Platinum Works was created, with Charles Engelhard as President. This was followed one year later by the incorporation of Baker & Co., Inc., and of this Corporation, Engelhard also became the active head. In 1907 the Irvington Smelting and Refining Works was added and this trio combined constitute today the largest platinum metals concern. European platinum firms originally owned the majority of shares in the above mentioned firms, but subsequently sold their holdings, so that today Baker & Co., Inc., is preponderantly owned by Americans.

Russia was practically alone in supplying the world with platinum until about the end of the last century. New and important competition then arose through the development of the resources of Colombia, South America, through the firm of Lewisohn. Still more important was the discovery of platinum, as we have mentioned above, in the great nickel mines of Sudbury, Canada. These are not only the richest nickel mines in the world, but also contain twice as much copper as nickel and in addition all the platinum metals except osmium. South Africa has disclosed large territories

with good resources of platinum and its byproducts, but the cost of production is still too high to allow this field to be considered as a serious producer.

The jewelry industry would prefer to see a high price for platinum because the more precious the better. It would be desirable, however, for the prices of platinum, and its byproducts as well, to be kept down within reason, and with respect to platinum itself, possibly at a level near the price of gold; otherwise, the general industries would be fearful of too great a financial risk in its wider employment.

Next to platinum is the important sister metal palladium, whose chief advantage is that it has only about one-half the specific gravity of platinum or gold. Its employment as a jewelry metal is steadily growing since it is a real "white gold" not in name only. Palladium at the present time finds its chief outlet in dentistry, as a replacer of gold, and since it shows so many technical as well as financial advantages, its still wider use seems only a question of time. The metal also finds an extensive use as contact points in the electrical industries.

Iridium and osmium, found preponderantly in the South African gold mines as a by-product, as well as occurring together as a natural alloy, osmiridium, in Tasmania, are two important metals. The former has so far commanded the highest price of any platinum metal, as a hardener of platinum; but it is somewhat more volatile than platinum, rhodium, or palladium, so that it is not quite so valuable in the chemical industries where it may be exposed to very high temperatures. Osmium finds its widest use in pen-points.

Ruthenium is used chiefly as a replacer of iridium for hardening platinum and palladium and is being much used in the jewelry field, but also for contacts and pen-points.

Rhodium is left to the last since it is considered the king of all the precious metals. The alloys of this metal with platinum have been all important in the chemical industries from the time, about forty years ago, that the well-known thermocouple, consisting of platinum 10%—rhodium against platinum, was developed into an accurate commercial tool for measuring temperatures.

Two great chemical discoveries for the last forty years are "rayon" and "fixation of nitrogen"—both are dependent on platinum. When, during the Great War, there was an immense demand for platinum the world over, with corresponding shortage in supply, the price rose rapidly to \$100 per troy ounce and subsequently reached a maximum of \$158 per ounce. Baker & Co., Inc., and its affiliates, The American Platinum Works and Irvington Smelting and Refining Works, were the only platinum refiners in America which the federal government kept going during the Great War under its own supervision. All other refineries and dealers had to deliver all their platinum to the government. At this period the Baker Company refined as high as 30,000 ozs. of platinum per week. Baker & Co., Inc., in conjunction with E. I. du Pont de Nemours & Co., Inc., devel-

oped a major improvement in the nitrogen fixation process, an alloy of platinum-rhodium, instead of platinum, as the catalyst for ammonia oxidation. The addition of rhodium prolongs the life of the platinum gauze by about 70%, reduces the loss of the catalyst, and at the same time gives a more complete conversion of the ammonia to nitrates. Platinum-iridium had been formerly used to some extent as a catalyst, but it is more volatile, hence the life of the gauze is very much reduced.

The consumption of platinum by different industries has shown many changes. Forty years ago platinum was used to a large extent for artificial tooth pins, subsequently nickel pins were employed in place of platinum, only to be itself displaced by a gold covered pin. This pin is again being replaced by a double coated nickel pin (half gold and half palladium over nickel).

The lead-in wire on electric lamps which accounted for one-third of the platinum consumption originally was subsequently replaced by a composite base metal wire developed by Dr. Colin G. Fink. In addition to the disappearance of platinum in electrical bulbs, the large platinum vessels used for the concentration of sulfuric acid have been practically discontinued. Nevertheless the consumption of *new* platinum in normal times keeps pretty steadily between 200,000 and 300,000 troy ounces per year. This means that when one industry stops or reduces the use of platinum another one takes it up for equally important purposes.

New precious metal alloys are constantly being developed for the production of rayon. But far above the prospects even in the rayon industry are the possibilities of the use of platinum-rhodium in the manufacture of glass wool in accordance with the Westinghouse/Baker/Owens-Glass patents. Costly and far reaching investigations were necessary to establish that the employment of platinum-rhodium was possible for the manufacture of glass wool on a large scale, because it was necessary to find the proper combination which would not be attacked by the molten glass during the process. Platinum-iridium had been tried, but due to the volatility of the iridium and the consequent loss of precious metal the process had to be abandoned. It is now possible to manufacture glass fiber 1/20th the thickness of a hair, and this Westinghouse-Baker-Owens discovery opens up a new future for the employment of glass fiber. For example, most fires originate in short circuits, and the value of glass as an ideal covering for electric wires is apparent, or glass may replace asbestos for curtains, or may become a competitor for cotton with all its eminent possibilities both financially and economically.

The reflectivity of silver is the greatest of any metal and gives a beautiful white color. Rhodium comes second to silver, having a reflectivity of 80% if that of silver is taken as 100. Furthermore, the covering capacity of rhodium is about 50% greater than the covering capacity of gold so that it is easy to be seen what can be accomplished with rhodium plating.

Germany's World Trade in Chemicals

Reviewed for the first six months of 1936 with special reference to American imports and exports, a report that has been abstracted in "Commerce Reports" but through the courtesy of the U. S. Department of Commerce is here published in full for the first time

By Sydney B. Redecker, American Consul, Frankfort-on-Main

GERMANY'S export of chemicals continued advances the first half-year, but weakening followed the marked gains in the second half of 1935. An increase of 4.5 per cent. was registered to 328,876,000 marks, compared with gains of 7.6 per cent. for the second half and of 12 per cent. for the last quarter of 1935. Although the trade in the first half year was 14,632,000 marks above the corresponding period of 1935, it was still 4,357,000 marks under the first half of 1934.

German Exports of Chemicals and Allied Products
(Thousands of Marks)

Quarter	1934	1935	1936
First	176,444	160,421	170,990
Second	156,789	153,823	157,886
First Half	333,233	314,244	328,876
Third	155,617	158,789	
Fourth	171,920	195,682	
Second Half ...	327,537	354,471	
TOTAL YEAR	660,770	668,715	

Contributory factors to the less favorable trade trend were probably the expiration of the initial export subsidization period in the spring coupled with excessive forcing of exports previously under compensation trade agreements. Following the institution of export subsidies from funds created by imposts on domestic industrial turnover, beginning the spring of 1935 and instituted tentatively for one year, Germany's export trade, including chemical products, expanded rapidly in the second half of 1935. After much discussion in secret meetings, the Government this spring decided to continue the export subsidies for another year. The basis of raising the funds was altered somewhat. Formerly they were provided exclusively by industries on their production for internal consumption. Under the revised arrangement domestic wholesale distributors also make contributions. In consequence of this revision contributions by producers will be smaller; but, owing to the incorporation of the wholesale trade, the total proceeds for subsidization of exports, will be larger.

Under the 1935 arrangement, the chemical industry was allotted a total quota of contributions to the fund

of 135,000,000 marks, payable by the various producers according to a sliding scale depending upon the branch of the industry and the size of the company. Under the 1936 arrangement it is understood that the total sum to be contributed by the chemical industry was reduced by one-third. It is reported that excessive forcing of exports last year under compensatory trade agreements has overstocked various foreign markets with German merchandise. Other difficulties arose owing to the concentration of foreign countries' purchases in Germany entailed in the bilateral trade policy involving payment of Germany's imports by means of depreciated "Aski" mark currency available solely for the purchase of German merchandise.

Chemical exports varied considerably in the various commodity groups but all, with the single exception of potash, recorded at least some value-improvement. Most pronounced gains were recorded for coal-tar products and explosives. Heavy chemicals, dyes, medicinals, pigments, paints, varnishes, showed less marked but still notable expansion. Nitrogen fertilizers declined in volume but gained in value, by around 10 per cent.; this contrary value and volume trend being recorded also for detergents.

Leading Groups in German Chemical Exports

Commodity Group	First Half Year			
	1935		1936	
	Metric Tons	Thousand Marks	Metric Tons	Thousand Marks
Coal-Tar Pitch, Crudes, Oils and Intermediates	46,547	4,777	75,562	6,054
Soaps and Detergents	5,067	5,007	4,634	5,265
Heavy Chemicals	641,240	76,906	717,147	79,808
Potash	484,415	18,019	223,450	12,468
of which:				
Crude	273,947	7,001	139,202	6,131
Processed	210,468	11,018	84,248	6,337
Nitrogen Fertilizer ...	371,291	27,056	349,874	30,832
Medicinals	2,369	45,154	2,538	45,344
Tar Dyes	16,011	60,782	17,119	67,142
Pigments, Paints, Varnishes and Lacquers	46,013	23,458	46,791	24,209
Explosives, etc.	2,654	5,449	4,264	8,418

Value increases generally surpassed those for volume, reflecting clearly the price enhancement, in

terms of Reichsmarks, of leading chemical groups in world markets. Typical of this trend were nitrogen and potash. Unit export values of both increased substantially in consequence of better international price regulation provided by the two new international cartel pacts consummated during 1935. Similarly the gains in value for coal-tar products, detergents, and dyes, were notably better than those in volume. On the other hand, heavy chemicals increased more in volume than value, suggesting the tardiness of heavy chemicals to reflect price improvement achieved by other chemical groups, especially those effectively internationally cartelized.

Chemical export gains were due largely to increases in shipments to Mexico, Chile, Colombia, Venezuela and some Central American Republics, Balkan countries (Yugoslavia, Rumania, Bulgaria, Greece and Turkey), and Scandinavian and Baltic States, constituting both sources of raw materials required by Germany and markets for German manufacturers. Germany's trade exchange with all these countries strikingly expanded in 1935 under the aggressive policy of bilateral compensation. While gains in chemical exports to these countries continued this year, difficulties were experienced with certain countries, notably Brazil and nearly all the Balkan States, resulting from the accumulation of heavy credit balances in blocked German currency beyond the current import needs for German merchandise of the countries concerned. In consequence, the tempo of chemical exports to some of these raw material supplying countries slowed down.

In contrast to the trade development with countries supplying raw materials, chemical exports to industrialized Western European countries equipped with domestic chemical industries continued the unfavorable downward trend of preceding years, resulting from the indisposition of these countries to take German chemicals in the presence of Germany's refusal to accept their manufactures.

Under official import control, restricting to absolute minima imports of even vitally needed raw materials and eliminating altogether unnecessary and competitive products, imports of officially classified chemical products declined in the first half-year to new low record levels of recent years, as disclosed by the following tabulation:

Germany's Imports of Chemicals and Allied Products

First Half Year	Quantity (Metric Tons)	Value (Reichsmarks)
1933	831,671	82,671,000
1934	1,018,654	101,954,000
1935	784,204	86,561,000
1936	607,258	76,469,000

The decline shown above was due to lessened receipts of artificial fertilizers, ethers, alcohols, aromatic chemicals, coal-tar products, and waxes. Imports of heavy chemicals increased in volume but decreased in value.

Various important chemical *raw materials* imported

by Germany on a large scale are not embraced in the foregoing table of officially designated chemical products. Within this larger chemical raw material classification numerous substantial increases in imports were recorded. In some cases these increases were forced by acute shortages resulting from previous severe throttling down of incoming shipments which seriously threatened continued operation of leading industries. Other increases were due to the acceleration of German economic activity. Among the leading individual chemical products showing substantial gains in imports were: flaxseed, cinchona bark, naval stores, linseed and tung oils, phosphate rock, paraffin, crude iodine, pyrites, raw sulfur, sulfuric acid, pyridine, casein, alkaloids, and derivatives. Leading items showing most marked decreases were: varnish gums, animal and fish fertilizer, coal-tar, coal-tar pitch, borax, bleaches, carbon black, crude methanol, basic phosphate slag, superphosphate, medicinal preparations.

Germany's chemical imports from the United States during the first half-year notably increased (comprising practically exclusively raw chemicals and non-competing products), to 19,314,000 from 14,952,000 marks, contrasted by a decline of exports to the United States, to 20,819,000 from 23,031,000 marks.

German Gains of American Chemical Imports

Gains in imports of American chemicals were due to increased purchases of essential oils, tobacco extract, phosphate rock, borax, benzol and paraffin jelly. The gains in phosphate rock were striking, amounting to well over 100 per cent. above the first half of 1935, attributable to difficulties in securing supplies from competing sources, North Africa and Soviet Russia, owing to the scarcity of foreign-exchange for these countries. American suppliers furnished 66 per cent. of the total enlarged phosphate imports this year, compared with 41 and 36 per cent. in the first halves of 1935 and 1934, respectively. In borax and benzol the United States similarly increased its share of the total German imports. Despite the gains in total imports of naval stores, American participation in this trade recorded further diminution.

On the other hand, American deliveries of coal-tar, coal-tar pitch, paraffin, sulfur, pyridines, metalloids, etc., and carbon black, fell off heavily. Coal-tar and coal-tar pitch were reduced practically to nil by the rigorous import control and adequate domestic supply. Paraffin showed heavy contraction, due to rapidly expanding domestic production calculated to create national self-sufficiency. Raw sulfur increased almost to 1934's high level, but American suppliers lost ground badly to Italy. The outlook for American sulfur in Germany, formerly a principal world market, is distinctly unfavorable due to the steadily rising domestic production from coal gases, coupled with the national policy of shifting purchases as far as possible to Italy under bilateral trade relations existing between the two countries. Carbon black, furnished, as hitherto, almost

entirely by the United States, contracted under the effects a domestic substitute material required by Government order to be consumed to a certain extent.

German Imports of American Chemicals

	1934		First Half Year 1935		1936	
	Metric Tons	1,000 Marks	Metric Tons	1,000 Marks	Metric Tons	1,000 Marks
Gum Rosin:						
Total Imports...	32,683	4,520	29,843	4,513	37,842	5,801
From U. S. A. . .	21,844	2,802	16,037	2,129	18,786	2,591
American share..	66%		54%		50%	
Turpentine:						
Total Imports...	11,195	3,899	9,737	2,904	11,631	3,102
From U. S. A. . .	5,977	2,258	2,851	1,007	3,018	994
American share..	53%		29%		26%	
Essential Oils:						
Total Imports...	661	3,002	675	3,204	709	3,173
From U. S. A. . .	46	181	28	116	27	168
American share..	7%		4%		4%	
Tobacco Extract:						
Total Imports...	615	633	397	412	426	485
From U. S. A. . .	378	328	219	184	231	216
American share..	61%		55%		54%	
Phosphate Rock:						
Total Imports...	351,634	6,943	372,291	7,613	495,619	10,527
From U. S. A. . .	126,590	2,433	153,140	3,204	325,597	7,374
American share..	36%		41%		66%	
Borax Ore:						
Total Imports...	10,703	937	12,123	993	16,459	1,655
From U. S. A. . .	10,703	937	11,025	871	16,041	1,614
American share..	100%		91%		97%	
Refined Borax:						
Total Imports...	6,564	1,048	5,269	870	2,961	417
From U. S. A. . .	6,195	947	4,592	743	2,735	361
American share..	94%		87%		92%	
Coal Tar:						
Total Imports...	24,647	1,123	7,395	326	550	23
From U. S. A. . .	8,722	375	nil	nil	nil	nil
American share..	35%		nil		nil	
Coal-tar Pitch:						
Total Imports...	31,908	1,625	7,584	344	100	3
From U. S. A. . .	8,123	387	1,278	61	nil	nil
American share..	25%		17%		nil	
Benzol:						
Total Imports...	40,682	10,538	31,759	7,319	32,759	6,943
From U. S. A. . .	6,514	1,583	7,677	1,851	17,038	3,345
American share..	16%		24%		52%	
Paraffine:						
Total Imports...	9,791	2,761	11,184	3,155	2,965	813
From U. S. A. . .	6,928	1,833	4,802	1,245	1,279	323
American share..	71%		43%		43%	
Petroleum Jelly:						
Total Imports...	1,812	460	1,620	363	1,959	473
From U. S. A. . .	1,587	386	1,488	306	1,663	357
American share..	88%		92%		85%	
Sulfur:						
Total Imports...	29,427	1,820	21,382	1,151	29,039	1,591
From U. S. A. . .	26,085	1,550	14,140	739	11,117	552
American share..	89%		66%		38%	
Pyridines, Metalloids, Etc.:						
Total Imports...	2,908	2,275	2,884	1,945	3,664	1,642
From U. S. A. . .	126	276	249	441	181	278
Aniline Dyes:						
Total Imports...	1,290	5,468	1,136	5,492	1,117	6,402
From U. S. A. . .	115	231	2.5	21	7.2	60
American share..	9%		0.002%		0.6%	

Carbon Black:

Total Imports...	4,041	1,427	5,953	2,094	3,298	1,117
From U. S. A. . .	3,956	1,381	5,806	2,034	3,219	1,081
American share..	98%		98%		98%	

TOTAL VALUE OF

AMERICAN IMPORTS	18,004	14,952	19,314
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The trend of exports to the United States varied among the chemical groups, some products showing heavy losses and others gains, in some cases substantial. The total decrease was due preeminently to sharp losses in a few leading items, notably potash, potassium carbonate, aniline and sulfur dyes, cyanides, medicinals, naphthalene, sulfides, synthetic aromatics and some other less important items. Quite likely the special American tariff concessions granted Switzerland during the first half-year and becoming available to other countries, except Germany, exerted a depressing effect upon dyestuffs, medicinals, etc., accounting for the losses here.

Offsetting the losses for the groups mentioned, a range of other products scored gains. These included synthetic camphor, heavy coal-tar oils, caustic potash, potassium chlorate, sodium sulfate, alums, various nitrogenous fertilizers (calcium nitrate, ammonium chloride, potassium nitrate and not specifically mentioned types), bitter salts, metalloids and acids not specifically mentioned, bronze powder, glue and gelatine, and cellulose derivatives. Various items of minor importance recorded notable increase.

Principal German Chemical Exports to the U. S.

Commodity	1935		First Half Year 1936	
	Metric Tons	1,000 Marks	Metric Tons	1,000 Marks
Shellac	153	192	163	160
Synthetic camphor	147	216	407	619
Tung oil .....	...	...	38	40
Miscellaneous vegetable oils..	604	152	994	249
Palm kernel oil (non-edible) ..	4,572	823	890	191
Pectin	37	83	56	134
Heavy coal-tar oils	1,867	90	10,016	661
Naphthalene	3,143	263	937	92
Creosote	269	152	553	454
Soft soap, etc.	57	96	67	62
Soap powder, etc.	18	51	15	65
Oxalic acid	45	22	58	23
Lactic acid	47	55	29	26
Tartaric acid	7	8	39	41
Paraffine salve, etc.	26	36	61	60
Sodium chloride	129	18	272	53
Raw potash salts	51,060	578	6,745	132
Caustic potash	612	211	762	246
Carbonate of potash	983	347	640	202
Caustic soda	21	10	23	25
Bromine salts	not stated		22	31
Bleaches, peroxides, etc.	361	59	185	30
Potassium chlorate	2,190	635	3,292	1,039
Sodium sulfate	25,265	682	47,810	1,235
Potassium sulfate, etc.	111,721	4,660	20,296	1,048
Ammonia, potash and other alums, etc.	460	194	998	412
Chrome, iron and copper alums	188	49	169	44
Sodium nitrate	133	15	166	25
Potassium nitrate	4,984	751	5,532	754
Barium nitrate	103	27	95	29

Principal German Chemical Exports to the U. S.— Concluded

Commodity	First Half Year 1935		First Half Year 1936	
	Metric Tons	1,000 Marks	Metric Tons	1,000 Marks
Ammonium chloride	886	146	1,428	200
Calcium nitrate	1,885	425	2,634	595
Ferro-ferri-cyanides	16	21	30	40
Cyanides	1,851	1,245	1,301	836
Lead acetate	95	38	80	35
Zinc chloride	198	36	535	86
Arsenious acids and compounds	99	69	46	27
Sodium and potassium sulfide, bi-sulfate, hydrated sulfite of soda, etc.	2,256	378	1,739	339
Phosphoric acid salts, sodium calcium, ammonium phos- phate, etc.	295	68	171	53
Calcium chloride	679	32	695	34
Chlorated hydrogen carbides..	52	28	58	38
Formic acid	49	20	147	67
Bitter salts (magnesium sul- fate)	3,617	161	3,340	191
Metalloids and acids, n. e. s., pyridine, etc.	1,161	3,079	1,807	3,444
Aniline and sulfur dyes	340	3,113	250	2,179
Alizarine (anthracene) dyes..	33	195	24	285
Indigo dyes	14	197	10	176
Ferrocyanide blues	17	44	18	60
Lithopone	113	34	76	26
Iron oxide	308	84	360	93
Earth pigments (umbra, sienna, etc.)	171	26	343	53
Bronze pigments	92	184	174	291
Copper pigments, etc.	257	141	52	67
Casein pigments	2	17	7	57
Prepared paints	19	71	18	81
Ethers	35	44	39	91
Essential oils	14	145	23	229
Synthetic perfume chemicals..	33	265	15	158
Cosmetics	9	33	5	30
Artificial guano, etc.	6,687	211	6,231	321
Superphosphate	not stated		651	29
Nitrogenous fertilizers, n. e. s.	939	147	2,190	306
Glue	212	102	348	201
Gelatine	153	606	192	863
Quinine salts and compounds..	0.25	13	0.4	14
Other alkaloids	1.02	51	1.88	89
Cellulose derivatives (acetyl, formyl, alkyl cellulose), etc.	17	63	27	112
Synthetic tanning materials ..	12	10	21	29
Prepared medicines	21	398	16	319
Non-prepared medicines	20	270	16	231
Miscellaneous chemical prod- ucts, disinfectants, insecti- cides, photographic, etc., n. e. s.	148	346	112	262
TOTAL VALUE OF EXPORTS TO UNITED STATES		23,031		20,819

Electrolytes in Electrolytic Condensers

Complex derivatives of sorbitol and boric acid, for use as electrolytes in electrolytic condensers, are made by heating sorbitol with boric acid and a base, or with an alkaline borate, to a temperature above 100° C. When boric acid is used, base may be ammonium, sodium or potassium hydroxide, mono-, di- or tri-ethanolamine or ethylenediamine. English Patent 448,830, '35. Telegraph Condenser Co., Ltd., London.

Explosion Hazards in Soy Bean Plants

Growing importance of soy bean oil in industry led Dr. David J. Price, Bureau of Chemistry and Soils, to outline to members of the American Soy Bean Association 8 safety rules to eliminate explosion hazards, particularly where the solvent extraction method is employed.

1. Follow the safety code for prevention of dust explosions in terminal grain elevators prepared by the dust explosion hazards committee of the National Fire Protection Association. It recognizes "good housekeeping" and clean premises as the 1st essential in elimination of dust explosion hazards.

2. Plants milling or processing soy beans should observe recommendations given in the code prepared by the same committee for the prevention of dust explosions in flour and feed mills.

3. Soy bean elevators and buildings in which grinding, milling or other preparatory processes are performed should be segregated from other parts of the plant. The milling room should have roof and wall vents to release explosion pressure without structural damage. There should be one square foot of vent for each 80 cubic feet of room space.

4. The same precautions should be observed in plants preparing protein products, particularly in the drying section.

5. Dryers in sections where inflammable dust is present should be separated from other parts of the plant and the room properly equipped with venting facilities.

6. Dust collectors should be installed outside the building. If this is impossible they should be vented outside the building.

7. In soy bean extraction plants precautions should be taken to provide for safe operation of such extraction units, particularly when the solvents employed constitute a recognized fire and explosion hazard.

8. In plants where inflammable solvents are used it is practical to install instruments which will detect inflammable vapors and give warning before explosive concentrations are present.

Free Acidity of Superphosphate

Method for determining free acidity of superphosphate (already employed by the United Swedish Superphosphate Manufacturers) is based on the use of cyclohexanol as a solvent, and was described in a recent issue of the *Angewandte Chemie* by Dr. Hans Lehreckem, director, laboratories of the Aktiebolag Kemiska Patent.

Cyclohexanol is entirely without solvent action on monocalcium phosphate in either aqueous solution or in phosphoric acid solution. Its solvent efficiency is limited to free phosphoric acid and sulfuric. Solvent can readily be recovered, and efficiency of the extraction is not influenced by the grain size of the sample of superphosphate which is under test. Actual method follows:

Two grams of superphosphate are well triturated in a mortar for about 5 minutes with 50 cc. of cyclohexanol. Mixture is then charged into two 30 cc. capacity tubes of a laboratory centrifuge and whizzed for about 15 minutes. Supernatant clear liquor is then removed by pouring or pipetting to the extent of 25 cc. (= 1 gram of superphosphate) and shaken for about 30 minutes with 250 cc. of water. Aqueous solution is now titrated, without separation of the cyclohexanol, with N/5 caustic soda solution, using methyl orange as the indicator until the neutralization point is nearly reached. Solution is thoroughly shaken again and filtered through a fluted paper. Filter paper allows aqueous solution to pass through, but retains the cyclohexanol, which can thus be completely recovered. Completion of the titration with the standard alkali solution is now effected on the aqueous solution. Method when applied to the same sample of superphosphate by a number of different analysts, gave results for free acid differing by an amount not greater than 0.07%.

Special Castings for Chemical Plant

By C. H. S. Tupholme

A FEATURE of technical advertising during the last few years has been the offers by foundries and engineering works to supply apparatus for use in chemical plants made of special cast metal and special alloys. Since the apparatus is intended for a special purpose, it is claimed that the materials from which it is made are highly resistant, whereas in many cases the actual qualities are far from substantiating this claim. Such materials are said to be proof against attack by acid or alkalis, or any other chemicals, and permanently resistant to the extremely high temperatures required in many chemical processes, and absolutely non-corrodible. Unfortunately the pans, kiers, piping, etc., constructed of such materials often prove a disappointment to their owners, resulting in a loss of faith which is certainly, to some extent, justified. Many chemical plant manufacturers avoid this possibility by deciding to regard a certain amount of wear and tear as absolutely unavoidable and contenting themselves with apparatus made from the metals and alloys regularly used in general machinery construction. The ease with which such metals can be cast and machined tends towards the rapid delivery of ordered apparatus.

Advantages of Special Castings

However, where really good special castings and alloys are to be obtained at reasonable prices, the technical and practical advantages gained by their use are so great that there should be no hesitation in choosing such materials in preference to those generally used for the construction of machinery intended for very different purposes.

Little has been published concerning the way in which such special alloys are manufactured, and the subsequent treatment they have to undergo in order to give them the special qualities required for chemical work. It is easy to understand, that firms which devote themselves to this class of work are not eager to give away the experience they have gained in such difficult technical questions. Such work cannot be sufficiently protected by patents, and the range of application is not very large.

In order to prevent improvements made under exceptionally difficult, costly and often dangerous circumstances, from falling into the hands of competitors, it is necessary to work in secrecy as far as possible. Large chemical works have therefore long recognized the necessity of having their own drawing offices, workshops and erecting shops, in order to be able to build and alter the machines and apparatus employed in their

own works according to the experience gained there, without having to call in outside help. This is certainly not the cheapest method of acquiring such machines but it has the merit of maintaining inviolate the secrets of their design and manufacture.

Practically the only publications accessible for general use are those regarding the results of experiments in government laboratories and institutions. But these publications, as a rule, are monographs which cover a very limited field and miss the impulse of industrial working.

It is absolutely impossible to obtain one alloy capable of complying with all the requirements of every chemical process; all that can be done is to strive to obtain the best material for any given conditions, its behavior under the same or similar conditions being known from experience or experiment.

The action taken by large chemical plants in building themselves the machines they require, also has the disadvantage of depriving them of the general experience and skilled workmanship of long-established engineering works. The best and most economical solutions of the problems involved can only be found by close collaboration between the chemist, the experienced foundry man and the engineer. Their decisions will then be based on the soundest chemical, technical and practical experience. The success of this plan depends, of course, on the trust put in the silence of the founders and engineers, to whom it is necessary to give a certain insight into the special details of the process which will be carried out in the machines they construct.

Necessity for Secrecy

Many foundries make a special point of keeping all particulars communicated by the chemical works strictly confidential, not only outside the works, but also inside, where they try, by a judicious distribution of the work, to avoid any possibility of leakage of information through intentional or careless indiscretion, only a few responsible persons having any connected knowledge of the process in question. Their laboratories, working in connection with the workshops and foundries, are well equipped for chemical and metallurgical testing and they have had so much experience in chemical work, that they can tackle any problem concerning the manufacture of chemical apparatus with a good prospect of success in solving it. Of course, one essential condition is that the chemists entrust them with all the information they require.

Very often inquiries containing only the most meagre

information are received. It is stated, for example, that "an alkali has to be concentrated in a closed vessel," or "saltpetre vapors have to be condensed in a closed system of piping," or "a furnace has to be fitted with retorts for high temperatures." But the specialist clearly requires further particulars to enable him to make the most suitable proposals. He ought, for example, to know the temperature limits, the degree of concentration, the range of pressure, etc., and if he can be initiated into certain details of the chemical process, it will help enormously towards obtaining a good result.

Preliminary Research Work

Every inquiry from the chemical industries must first be examined to see if all necessary information has been given. If this is the case, further chemical or metallurgical tests, if required, must be made in the works laboratories, and from them the most appropriate composition of the material to be used is determined: it may be a special cast-iron, a special cast-steel, or a special alloy made up of various elements.

After the chemist and the metallurgist have decided upon the chemical composition of the materials, the founder has to say how the mixtures thus "theoretically" determined are to be cast, and also if the results will comply with the requirements of the chemical works. At this point it is often found that the ideas of the various specialists conflict, so that it is necessary for mutual concessions to be made. Such difficulties are always more easily solved in a large engineering works and foundry where the ways and means are many, and experience is great. After the piece has been cast, it may have to be submitted to certain chemical, mechanical or thermal treatment. All these points should be taken into consideration from the first.

Economy of Special Castings

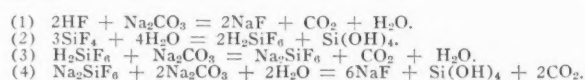
From what has been said above, it can be seen why the first costs of such special castings are sometimes high; but the value to the chemical plant of the finished apparatus is correspondingly greater due to its many advantages. For instance, it can work continuously, its running costs are much lower, it requires fewer alterations, a smaller stock of reserve parts, and is more reliable, as the chemical process is not interrupted because of defects in the apparatus caused by the use of unsuitable materials. Of greater importance is the fact that the use of such special apparatus lessens the danger of explosion, by which great damage may be done and even lives lost; and it has not the disadvantage of influencing the character of the chemical product adversely.

The use of the term "special castings for chemical work" must therefore imply that extensive scientific and practical research work has been carried out in connection with their manufacture.

Synthetic Cryolite Production

Only economic natural deposit of cryolite is in Greenland. Russian chemists are working on the synthetic production of the double fluoride salt of sodium and aluminum synthetically. A cryolite for use in the aluminum industry must be as free as possible from silica; for its other main use, as an opacifier in glass and enamels, this is not so essential. One of the main sources of fluorine is waste gases from superphosphate. Attempts to use these gases for the manufacture of sodium fluoride have not been always successful owing to the difficulty of obtaining the product free from silica.

In Russia a process is being examined on the semi-large scale by Fedotjew and Lopatkin, *Journ. Chem. Ind. Russ.*, '12, 265, which gets over this difficulty by absorbing the exit superphosphate gases not in water but in sodium carbonate solution. Process is applied to the manufacture of superphosphate by the treatment of Chibina apatite with sulfuric, and the waste gases are in this case somewhat richer in fluorine compounds than are those from the superphosphate processes using African or American phosphate rocks. Reactions which occur when the gaseous mixture of hydrofluoric acid and silicon tetrafluoride is absorbed in soda solution are expressed in the following equations:—



Final reaction products are thus sodium fluoride, hydrated silica, carbon dioxide, and water. Equation (4) does not take place quantitatively. Silica precipitate always contains from 17 to 30% of fluorine, partly in the form of sodium silicofluoride and partly as sodium fluoride. Aqueous solution of sodium fluoride is, however, practically free from silica. By suitable selection of the concentration of the soda solution, it is possible to obtain a saturated solution of sodium fluoride containing traces only of silica and very small quantities of free soda. About 85% of the hydrofluoric in the original gases can be obtained in the form of sodium fluoride.

Utilization of sodium fluoride for the production of synthetic cryolite has been studied by Tischtschenko and Ignatowitsch, who have found that the reaction



takes place satisfactorily when the sodium fluoride is employed in the form of an emulsion, disperse phase of which consists of the undissolved fluoride and the continuous phase of a saturated aqueous solution of sodium fluoride. This process, is, however, costly in fuel and offers numerous corrosion difficulties.

The sulfate ions produced by the dissociation of the aluminum sulfate solution adversely influence the formation of the cryolite, and the fluoride content of the cryolite produced can be increased by neutralization with soda. If the hydrogen ion concentration of the solution be maintained between 4.2 and 6, the fluorine content of the cryolite is about 15.8%. Working at a pH of 8 to 9, the fluorine content is about 32%. The precipitate is, however, still contaminated by the presence of aluminum hydroxide.

Use of Sodium Sulfate Preferable

Better results are obtained by using sodium sulfate to suppress the hydrolysis of the aluminum sulfate, a precipitation containing 51% of fluorine, 13 to 14% of aluminum, and 33.6 to 35% of soda, can be obtained by heating at 95° C. a mixture of a saturated solution of sodium fluoride and a 10% solution of aluminum sulfate, with the addition of about 10% of Glauber's salt on the weight of the aluminum sulfate. The precipitated cryolite is best separated from the mother liquor by centrifuging, since it tends to block up the pores of filter cloths. Review of the process appeared in full in the *Chemiker-Zeitung*, July 15th, and was digested in *British Chemical Trade Journal*, Aug. 28, '36, p166.

Pulp Bleaching Progress

A Review of the Latest Developments in the Technique of Paper Manufacture

IN the bleaching of pulp, if the free chlorine is applied in open beaters more or less considerable losses of chlorine occur due to the escape of chlorine gas. Further difficulties arise through the chlorine gas introduced not reacting speedily enough with the pulp, on account of its relatively small solubility in water. The main feature of a new bleaching beater (D.R.P. 583,895), which has been constructed with the aim of avoiding these disadvantages, lies in the fact that a portion of the stuff stream is led, in a continuous way, through an enclosed trough, which is connected at both ends to the beater, and in which the stuff is brought into contact with the chlorine. Since the trough is totally enclosed and arranged at a much lower level than the beater it is always filled with pulp, so that the chlorine keeps in intimate contact with the pulp, and gradually dissolves in the latter, particularly if the trough is of sufficient length.

Bleaching Towers

For the bleaching of pulp bleaching towers are in use with sections to separate the rising and the settling of the stock, the latter being circulated by means of propeller wheels. During the circulation, gaseous or liquid bleaching agents are added to the stuff in the bottom part of the section for the upward movement with the application of pressure, causing the material to be bleached, generally of high consistency, to rise more freely and rapidly, which fact in turn reduces the power consumption. Contrary to this arrangement, according to a new process (D.R.P. 585,146, and additional patent 604,950), the material to be bleached is delivered, in measurable quantities, into the section for the upward movement by a one-chamber cell wheel with vertical axis in the settling portion of the tower. In the former section it is met by a powerful current of compressed air coming through the false bottom of the section, and carrying bleaching agents. The pulp is pressed upwards, and thrown over the partition wall into the settling chamber. By this method the stuff becomes thoroughly defibred and made very accessible for the action of the bleaching agents, the thus-produced large surface area of the material to be bleached offering intimate contact and causing a rapid and intensive chemical action to take place. This arrangement for the bleaching of pulp of high consistency works only in the case of a certain quantity to be bleached, which is being circulated in the plant until the desired degree of bleaching has been attained. However, in view of the very effective bleaching action yielded by this process, in many cases a single circulation will be sufficient. For this reason as well as in order to more economically utilize the capacity of the plant with the view to arranging bleaching, this process has been modified in such a way that a second settling chamber has been affixed to the rising section, in which the material to be bleached settles after having passed the first settling chamber (as mentioned before) and the rising chamber.

Further improvement is offered by another method (D.R.P. 591,111), inasmuch as it opens the possibility of adjusting the hydrogen ion concentration for the individual bleaching phases most suitable as regards the preservation of the fibre with most intensive bleaching effect. The bleaching agents applied in this process are caustic liquor and chlorine, both of which are added to the material to be bleached, suspended in water in such a way that they are, at first, added simultaneously, then separately one after the other, and, should it be found necessary, again simultaneously according to the pH value required, and

according to the nature and consistency of the material to be bleached. This method is particularly suitable for the bleaching of easy bleaching sulfite pulp, for so-called half pulps, and even for pulps hitherto considered unbleachable, such as hardcooked sulfite pulp contain-

ing excess lignin, or soda or kraft pulp. The process will produce yields of 86 per cent. of highly white bleached stuff, and, in addition, obviates the preparation of the bleaching liquor.

All bleaching processes aim at preserving the fibre as much as possible, at saving of bleaching agents, and at obtaining a good bleaching effect in as short a bleaching period as possible. These advantages are realized to a great extent by the new process, according to D.R.P. 602,156, principally through the bleaching being carried out by means of gaseous bleaching agents dissolved in water, in one or more stages. The bleaching stage of low consistency takes place in two separate tanks in such a way that in the first small tank chiefly the physical adsorption of the bleaching agent occurs, while in the second larger tank the actual chemical bleaching action takes place. In order to prevent the mixing of the pulp carrying the bleaching agents with the pulp freshly pumped into the tank, the stuff is made to flow uniformly mixed in the adsorption tank from the bottom towards the top. The order of the stages may be varied for the purpose of adapting the process to different grades of pulp.

Lately, attempts have been made, so far unsuccessfully, to bleach diluted fibrous material, especially cellulose pulp, in a centrifuge. The problem has now been solved by a relatively simple process (D.R.P. 601,090). The material to be bleached is furnished continuously at one of the ends into a revolving centrifuge drum having perforated walls and runs out of the drum over the edge at the other end. During the passage the bleaching agent (gaseous or liquid), is added through the perforated drum wall from a chamber enclosing the latter. The bleaching effect depends hereby on the one hand upon the pressure prevailing in the chamber, and on the other hand upon the velocity of the centrifuge drum. By altering the number of revolutions of the centrifuge or by alteration of the pressure of the bleaching agent any desired degree of penetration of the material to be bleached by the bleaching agent may be obtained, i.e., any desired degree of bleaching.

Removal Bleaching Liquids from Pulp Stocks

Finally, a modern process is discussed dealing with the removal of bleaching liquids from pulp stocks revolving with variable velocities. Up till the present wire drums, wire bottoms, or cell filters have been applied, which generally have but a low degree of efficiency, i.e., they remove small quantities of bleaching liquor only. This fact renders the whole process long and expensive. The disadvantages are caused through the filtering areas being rapidly made up by fine fibre particles. The new feature of this process (D.R.P. 586,205), which similarly frees the pulp stock from bleaching and other liquids on filter areas, lies in the fact that the liquid is taken or pressed out at places of maximum circumferential velocity. The circumferential velocity given to the fibre becomes the smaller while the pulp stock is away from the point of motion, so that the fibrous mass settles on these points and clogs up the meshes of wires, etc., more readily than on places of maximum circumferential speed. Contrary to methods already known, this process deals with stocks being circulated.

From an account by Dr. Dipl.-Ing. A. Foulon given in a recent issue of *Wochenblatt für Papierfabrikation*, dealing with improvements made recently in connection with the bleaching of cellulose pulps.



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Luminous Paints, Pigments

In the manufacture of luminous pigments the quality and purity of the raw materials are of the greatest importance. The calcium oxide used in most luminous pigments is obtained by calcining pure marble or Iceland spar. The sulfur used should be recrystallized from carbon bisulfide. Only purest rice starch and not impure potato starch should be used as reducing agent. The following mixture yields a satisfactory luminous base.

Calcium oxide.....	5 parts by weight
Sulfur	10 parts by weight
Starch	2 parts by weight

This base can be activated with a solution of $\frac{1}{2}\%$ thorium nitrate and $\frac{1}{2}\%$ bismuth nitrate in alcohol slightly acidified with nitric acid. One of the fundamental requirements is a good and uniform distribution of the effective heavy metals throughout the whole mass. This is accomplished by grinding thoroughly a portion of the base in the solution and slowly adding more base until all ingredients have been mixed carefully.

The color of the luminescence can be varied and controlled within wide limits. A blue luminescence is emitted by the following pigment according to H. Th. Mayer (*Farben-Chem.* 7, 205, 1936).

Luminous base.....	15 parts by wt.
Potassium sulfate.....	0.25
Sodium sulfate.....	0.25
Bismuth nitrate solution.....	0.5 ccm.
Thorium nitrate solution.....	1.0 ccm.

This mixture is calcined for fifteen minutes at white heat. The crucible is first charged with a layer of charcoal or coke on which the mixture is pressed and allowed to dry thoroughly. The crucible is then covered with a lid and sealed with a magnesia cement. After calcination is completed the crucible is removed from the furnace and cooled quickly. The resultant luminous pigment should be kept in large pieces in well sealed containers. For incorporation in luminous paints the pigment should be powdered only coarsely since very fine grinding affects luminosity adversely.

The following pigments can be prepared in a similar manner.

Yellow Luminous Pigment:

Barium oxide.....	10 parts by wt.
Sulfur	3
Starch	1
Potassium sulfate.....	0.1
Bismuth nitrate solution.....	0.5 ccm.
Thorium nitrate solution.....	1.0 ccm.
Calcining time 35 minutes at white heat.	

Green Luminous Pigment:

Strontium oxide.....	10 parts by wt.
Sulfur	8
Starch	2
Potassium sulfate.....	0.25
Bismuth nitrate solution.....	0.5 ccm.
Thorium nitrate solution.....	1.0 ccm.

Calcining time 25 minutes at white heat.

Other colors can be produced by varying the activating salt. Uranium salts give blue to bluish violet luminescence; cerium salts, reddish-yellow; antimony salts, greenish-yellow; mercury salts, green; manganese sulfide, golden yellow; gold salts, green; copper salts, green; molybdenum sulfide, orange; and lead sulfide, blue-green. Colloidal solutions of metallics or sulfides which can be kept in colloidal solution by the formation of complex salts may also be used as activators.

Textiles

Eumol, a product introduced by *Bulletin de la Societe Industrielle de Mulhouse*, replaces a part of the aniline in the padding bath for Prussian black, and effects a saving of 20 per cent. on all the chemicals. H. Sunder and L. A. Lantz, who perfected the process, have used Eumol in the proportion of 10 per cent. recommended by the B.A.S.F. and have obtained a black 20 to 25 per cent. darker than in the bath without this product. Process involves use of aminoazobenzene and results are outlined in full in *Dyer & Textile Printer*, Aug. 14, '36, p.166.

Month's New Dyes

New colors added to the Calco line include Calcoloid Yellow 5GD Double, the latest addition to the company's line of dispersable vat powders. This standard, like others in the group, may be dyed on yarn or piece goods by the various methods usually employed. Calcomine Blue RRW is offered as similar in general properties to Calcomine Blue RW. It is of particular interest, however, because it possesses greater drawing power on tin weighted silk when applied in heavy percentages. This permits the more economical production of heavy navy shades. This property also carries through to dyeings made on rayon.

Asbestos Fabrics Dyed

Vari-colored asbestos fabrics are being manufactured in England and, being fireproof, are recommended for rugs, table covers, kitchen aprons and the like, according to reports received in the Commerce Department's Chemical Division. The discovery concerns a dye by which asbestos woven into a fabric may be colored—an accomplishment which neither mineral nor vegetable pigments have hitherto succeeded in performing.

Glass

Crystalex, plate glass manufactured by Pittsburgh Plate Glass, gives truest color transmission. It is a water-white glass, colorless both in surface and transverse section. Its transmission value for all colors of the spectrum is very nearly uniform (88% to 92%), and therefore its transmission of the violet, blue and red rays is much higher than that of ordinary plate glass.

Glass-Clad Batteries

A battery for automobiles, which will employ spun glass porous mats to retain the active lead particles in the plates, will be placed on the market shortly by National Battery Co., St. Paul, Minn. The glass-clad battery is demonstrated as one of the newest successful applications of fibrous glass for manufacturing purposes. Capable of double the life of batteries formerly on the market, the scientific principle behind this invention depends on spun glass for its success.

Coatings

No. 1331 Beckosol is a pure alkyd of the long oil, oxidizing type. It is an exceptionally fine grinding vehicle, particularly suited to the preparation of pastes which, by the use of a strong solvent, may be reduced with plastic resin solutions. Manufactured by Beck, Koller, Detroit.

Improved Flat Varnish

An improved type of flat varnish having the following features is announced by Marietta Paint & Color Co., Marietta, Ohio: 1. Has new flattening compound; no metallic soaps used. 2. Does not skin over. 3. Dries to a hard tough film that doesn't become brittle. 4. Is clear and free from gray smoky appearance. 5. Can be rubbed on the day following application. 6. Is alcoholproof, waterproof, printproof. 7. Is available in any desired luster.

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INTERMEDIATES

Rubber Paint

Surfaseal, a rubber paint manufactured by Collord, Inc., 1430 Rosedale Court, Detroit, Mich., is applied to clean metal, preferably etched or sandblasted, by brushing or dipping. A special primer is available for use on untreated metal. It is said to be immune to alkalis; highly resistant to acids, and an unusually efficient corrosion inhibitor.

Oil Paint Paints Over Calcimine

Bondlite is an oil-base paint announced by Wilbur & Williams Co. of Boston. Manufacturer claims it is actually five paints in one, for aside from being a sealer over calcimine and a sizer over porous surfaces, it provides flat, semi-gloss, or gloss finishes when properly mixed with turpentine, varnish, or mineral spirits.

Non-Inflammable Cellulose Enamel

Emailliola, a non-inflammable cellulose enamel, which can be applied at relatively low temperature, is being manufactured in Germany, according to the Dept. of Commerce, from Trade Commissioner, E. M. Stephenson, Berlin. It is made in various colors as a transparent or cover glazing, but not in perfectly clear form or in pure white, though progress is being made in the development of these types also, and their commercial production is expected soon.

Miscellaneous

Syenite, a rock closely allied to granite, is a satisfactory substitute for feldspar in the pottery industry, according to the research of Drs. Chas. A. and John H. Koenig at the Ohio State University.

New Peptizer

Nusope is the name of a new series of products announced by Nuodex Products, Inc., Elizabeth, N. J., for which many interesting characteristics are claimed. Nusope 33-A has a very decided peptizing action upon gels. It will lower the viscosity of starch solutions, gum tragacanth and other aqueous gels as well as peptize organic solvent gels such as those obtained through the use of aluminum stearate and other bodying agents in petroleum distillates and other organic solvents. Product is neutral and its rate of hydrolysis is about $\frac{1}{8}$ that of sodium stearate.

New Thermo-Plastic Non-Shattering

Pontalite, a water-clear plastic, strong as glass, flexible, and non-shattering, was described by H. R. Dittmar (du Pont) in a paper to the recent A. C. S. meeting in Pittsburgh. It is known as methyl methacrylate polymer, and solutions have been used successfully in impregnating wood, cloth, paper, stone, and electrical apparatus.

Sodium Sulfite in the Leather Industry

German research on the sulfide process of dehairing in the leather industry reported by Dr. A. Kuntzel, of Darmstadt, to the recent meeting of the Verein Deutscher Chemiker, indicates the value of using not sodium sulfide alone, but sodium sulfide mixed with sodium sulfite. During the keratolysis process, part of the sodium sulfide is converted into sodium disulfide, which is inactive for the purpose desired. In the presence of sodium sulfite, however, the disulfide is reduced to the monosulfide.

Better Heat Resistance in Moldings

Temperatures up to 450° F., will not affect moldings made of improved heat-resistant material recently developed by General Plastics, North Tonawanda, N. Y. New material, available in black and brown, known as No. 34 and 37, is intended for use on parts which must retain their dielectric strength without carbonization under relatively high heat.

New Organic Fertilizer Material

A process has been patented by A. G. Stilwell, 111 E. 32nd St., New York City, whereby the concentrated slop from distilleries is converted into a valuable organic nitrogen-potash compound known as Norganok.

Acetylene as Photographic Chemical

Dr. W. Kleist, of Munich, in a paper to the general meeting of the Verein Deutscher Chemiker, described recent German research which demonstrated the value of acetylene in photography. When present in alkaline photographic developers, acetylene has a very marked action in preventing "fogging." The more alkaline the solution, the greater the efficiency of the acetylene in this direction. With metol, a typical surface developer, retardation of the speed of development and the sensitivity loss of a silver bromide plate, as compared with an acetylene-free developer, is of inconsiderable dimensions, but with typical deep developers, *e.g.*, glycine, the influence in these directions is more marked. The fog-preventing effect of acetylene appears to be particularly great in an acetone-containing pyrogallol developer.

Magnesia Beneficial Ingredient Fertilizer

Magnesia limestone can be mixed with standard fertilizers without impairment of efficiency, according to F. G. Keenan and W. A. Morgan (du Pont) in a recent paper to the A. C. S., Fertilizer Division. The magnesia besides being effective in treating systematic acidity of the soil likewise has beneficial effects, they state.

Method Preserving Fresh Milk

A German scientist claims a method of preserving milk and other dairy products in a fresh state over long periods by the application of oxygen and controlled refrigeration, according to a report from the American Consul, Frankfurt-on-Main, to the Chemical Division, Dept. of Commerce. Process, patented in Germany, is said to be simple: oxygen being added to milk under low pressure.

Glue from Shredded Rabbit Skins

Manufacture of glue from shredded rabbit skins is being carried on in Belgium, according to a report from Brussels. Belgium is favorably situated for the production of rabbit skin glues, since the world-wide reputation of Belgian hares has made it a clearing house for rabbit skins from many parts of the world.

Sawdust in Plastics

Conversion of sawdust into a stiff, hard, resistant plastic, by "digesting" it with chemicals and adding aniline and furfural to the mixture before subjecting it to pressure of from 2,000 to 3,000 lbs. per sq. in. at moderate temperature, was reported by Dr. E. Bateman (Forest Products Lab.) at a recent meeting of the A.C.S.

Explosives from Apricots

A discovery in Australia that material for powerful explosives exists in the stones of apricots has created a demand for all that can be supplied, according to the Australian Press Bureau.

Glycerine from Rice

Manufacture of glycerine from broken rice and rice waste has recently been perfected in Italy. According to one of the inventors, 100 kilos of broken rice will give a yield of 30.4 kilos of glycerine, 7.8 kilos of ethyl alcohol and 7.1 kilos of vegetable casein. Production costs, including investment in plant, are not excessively high since the equipment required is relatively simple, comprising vats with temperature control, filtering apparatus and centrifugals. The raw materials required are powdered rice, malt, sodium sulfite and brewers' yeast. Negotiations are said to be pending for the sale of the process for Italy to one of the largest saponification companies and producers of crude glycerine.

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HOOVER CHEMICALS

U. S. Chemical Patents

A Complete Check-List of Products, Chemicals, Process Industries

Agricultural Chemicals

Production calcium cyanamide from calcium phosphate. No. 2,052,920. Nikodem Caro, Berlin-Dahlem, Germany.

Air dehydration unit. No. 2,052,931. Jas. M. Lednum, Baltimore, and Wm. Marshall, Catonsville, Md., to Davison Chemical Corp., Baltimore, Md.

Preparation phosphate fertilizer; reacting a superphosphate with ammonia and mixing resulting product with a finely divided material from the group of calcium and magnesium carbonates. No. 2,053,432. Edward W. Harvey, Highland Park, N. J., to Barrett Co., New York City.

Cellulose and Derivatives

Composition comprising a cellulose derivative having as a modifier the benzyl ether of the ethyl ester of an acid from the group of glycolic and lactic acids. No. 2,051,877. Barnard M. Marks, Arlington, N. J., to duPont Viscoid Co., Wilmington, Del.

Preparation aralkyl ethers of cellulose. No. 2,052,145. Eugene J. Lorand to Hercules Powder Co., both of Wilmington, Del.

Treatment and production cellulose derivative materials. No. 2,052,557. Henry Dreyfus, London, England.

Cellulose acetate material for playing cards, etc.; 1. opaque sheet having sp. gr. of less than 1.5, containing cellulose acetate, cellulose nitrate, in such proportion as to inhibit curling, plasticizers for same, and titanium dioxide. No. 2,052,602. Wm. Bowker, Newark, and Bjorn Andersen, Maplewood, N. J., to Celluloid Corp., Newark, N. J.

Manufacture films and foil from cellulose derivatives. No. 2,052,695. Arthur Howarth, Chiverton, Gravesend, Kent, England.

Production cellulose derivatives. No. 2,053,280. Robt. E. Fothergill and James F. Haskins to du Pont, all of Wilmington, Del.

Preparation cellulose derivative compositions. No. 2,053,289. Emmette F. Izard, Elsmere, Del., to du Pont, Wilmington, Del.

Dressing yarns or filaments of organic derivatives of cellulose, which comprises forming a rough coating of wax thereon. No. 2,053,305. Wm. Whitehead, Cumberland, Md., to Celanese Corp. of America, a corporation of Del.

Production cellulose organic ester composition containing the ethyl ether of ethylene glycol mono-iso-caproate. No. 2,053,515. James D. Coleman, Jr., and Henry B. Smith, to Eastman Kodak Co., all of Rochester, N. Y.

Hydrolysis of cellulose esters containing higher fatty acid groups. No. 2,053,527. Carl J. Malm, Rochester, N. Y., and Chas. L. Fletcher, Kingsport, Tenn., to Eastman Kodak Co., Rochester, N. Y.

Preparation cellulose organic ester compositions containing tri-ethylene glycol di-alpha-hydroxy isobutyrate. No. 2,053,539. Henry B. Smith to Eastman Kodak Co., both of Rochester, N. Y.

Manufacture chlorine-containing cellulose derivatives; treating a substitution derivative of cellulose containing a hydroxy radicle in a substituent group with thionyl chloride. No. 2,053,768. Henry Dreyfus, London, England.

Production pulverulent cellulose. No. 2,054,301. Geo. A. Richter to Brown Co., both of Berlin, N. H.

Process making ethereal cellulose derivatives. No. 2,054,746. Chas. Granacher to Society of Chemical Industry in Basle, both of Basel, Switzerland.

Coal Tar Chemicals

Preparation 4-hydroxy-pyrene. No. 2,052,216. Martin Coren and Heinrich Vollmann, Frankfurt-am-Main, Germany, to General Aniline Works, Inc., New York City.

Production zinc derivatives of diazo salts. No. 2,052,386. Alfred Davidson, Crumpsall, and Wm. Galway Reid, Derby, England, to Imperial Chemical Industries, Ltd., Westminister, England.

Nitration of dibenzanthrone compounds. No. 2,052,614. Maurice H. Fleysher, Buffalo, N. Y., to National Aniline & Chemical Co., New York City.

Production aryl-naphthylamines. No. 2,052,633. Fred. H. Kranz, Buffalo, N. Y., to National Aniline & Chemical Co., Inc., New York City.

Purification of anthracene. No. 2,052,722. Arthur H. Radasch, Bloomfield, N. J., to Barrett Co., New York City.

Simultaneous preparation dihydroterpineol and menthone. No. 2,052,736. Adolph Zimmerli, New Brunswick, N. J., to Newport Industries, Inc., Pensacola, Fla.

Preparation oil-soluble phenols by reacting a terpene hydrocarbon material with a phenol in presence of acetic and sulfuric acids. No. 2,052,858. Chas. P. Wilson, Jr., Houston, Tex.

Synthesis of organic compounds in the vapor phase in which carbon monoxide is one of the reacting constituents, comprising reaction in presence of a hydrogen halide and active carbon. No. 2,053,233. John C. Woodhouse to du Pont, both of Wilmington, Del.

Production amino-antraquinones. No. 2,053,278. Geo. Holland Ellis and Frank Brown, Spondon, near Derby, England, to Celanese Corp. of America, a corporation of Del.

Preparation solid tetrazo salt; tetrazotizing 1,4-diamino-benzene in concentrated sulfuric acid, then separating, at a temp. of below 0°C., the solid tetrazonium sulfate from the concentrated sulfuric acid tetrazo solution. No. 2,053,745. Karl Schnitzpahn, Offenbach-am-Main, Germany, to General Aniline Works, Inc., New York City.

Production alkyl ethers of phenols and alkylated phenols; causing an

olefine to act in presence of a surface catalyst at 135-200°C. on a phenolic body. No. 2,054,270. Walter Schoeller and Hans Jordan to Schering-Kahlbaum A. G. Berlin, all of Berlin, Germany.

Coatings

Production films from vinyl resins. No. 20,080. Reissue. Harold F. Robertson, Coraopolis, Pa., to Union Carbide & Carbon Corp., New York City.

Apparatus and method sensitizing rotoeravure carbon tissue. No. 2,051,826. Schuyler B. Davenport, Bound Brook, N. J., and Alfred Savio, Dunellen, N. J.

Production lacquer comprising a polymeric vinyl halide. No. 2,052,000. Fritz Oschatz, Mannheim, Germany, to I. G., Frankfurt-am-Main, Germany.

Coating composition comprising a pure cracked tar petroleum resin and a volatile petroleum hydrocarbon solvent. No. 2,052,173. Per K. Frolich, Carl Winning, and Stewart C. Fulton, Elizabeth, N. J., to Standard Oil Development Co., a corporation of Delaware.

Joining or cementing glass building units; coating adjacent edges of units with homogeneous viscous solution of a polymerized synthetic resin. No. 2,052,229. Jas. Franklin Hyde to Corning Glass Works, both of Corning, N. Y.

Protective coating; liquid composition comprising D. R. C. liquid latex, casein, kaolin, thymol and water. No. 2,052,393. Ralph M. Freydborg to Materials Protector Corp., both of New York City.

Manufacture coating compositions; 1. process of dispersing dry pigment in a colloided cellulose derivative medium. No. 2,052,470. Robt. Tyler Hucks, South River, N. J., to du Pont, Wilmington, Del.

Coating composition containing as the sole essential film-forming ingredient, a tough and strong artificial resin resulting from the conjoint polymerization of a vinyl halide, with a vinyl ester of a lower aliphatic acid together with a plasticizer for the resin. No. 2,052,658. Ernest W. Reid, Pittsburgh, Pa.

Protective transparent cellulose foil adapted to be united by application of heat to a placard or other base material. No. 2,053,011. Hans Isaac Schulz and Julius Appel, Bomlitz, near Walsrode, Germany.

Manufacture shadow producing screens for luminous projections, using sheets of a transparent substance such as cellulose acetate. No. 2,053,173. Eugene Astima, Paris, France.

Apparatus and process for surfacing sheet material with pigments, varnishes, lacquers, waterproofing solutions, etc. No. 2,053,494. Wilfrid Bayley Pirie, Hildenborough, and Cyril Arthur Chester and Wm. Melville, London, England, to Raymakers Syndicate, Ltd., London, England.

Film treatment process; treating emulsion side of film with mixture of camphor and formaldehyde. No. 2,053,621. Albert I. Mackler, Jamaica, N. Y.

Method and apparatus for production of film by the extrusion of a coagulable solution through an elongated orifice. No. 2,053,920. Arthur Schade, Wiesbaden-Biebrich, and Eugen Schweitzer, deceased, late of Wiesbaden-Biebrich, by Anni Schweitzer, administratrix, Wiesbaden-Biebrich, Germany, to du Pont, Wilmington, Del.

Base for coating compositions, comprising an interpolymerized product from a conversion product of a drying vegetable oil and a polymerizable vinyl compound. No. 2,054,019. Otto Jordan, Mannheim, and Leo Kollek and Hanns Ufer, Ludwigshafen-am-Rhine, Germany, to I. G., Frankfurt-am-Main, Germany.

Continuous method of making flexible, self-sustaining sheet material from a thermoplastic composition. No. 2,054,114. Allen Abrams and Charley L. Wagner, Wausau, Wis., to Marathon Paper Mills, Rothschild, Wis.

Method forming flexible sheets, films, or coatings from a low temperature, self-vulcanizing wax-rubber composition. No. 2,054,115. Allen Abrams, Charley L. Wagner, and Geo. W. Forcey, Wausau, Wis., to Marathon Paper Mills, Rothschild, Wis.

Laminated sheet material which is waterproof, moistureproof, gasproof, light color, odorless, glueable, and printable; layers of same being united by a continuous flexible film formed from a composition of wax, rubber, a vulcanizing agent, accelerator, activator, pigment, and an age resistor. No. 2,054,116. Allen Abrams, Charley L. Wagner, and Geo. W. Forcey, Wausau, Wis., to Marathon Paper Mills, Rothschild, Wis.

Production photographic film containing a cellulose ester. No. 2,054,284. Walter Forstmann, Berlin-Schöneberg, Germany, to Voigtlander & Sohn Aktiengesellschaft, Brunswick, Germany.

Bleach-out layer for color photography; a sensitive layer carrying a plurality of different dyes, having incorporated a bleach-out sensitizer. No. 2,054,390. Ernst Rust, Zurich, Switzerland, and Andre Polgar, Paris, France.

Process impregnating sheets of cellulosic material with a synthetic resin consisting of a phenolaldehyde condensation product, and forming sheets into a single composite structure by applying heat and pressure. No. 2,054,444. Peter Pinten, Cologne-Deutz, Germany, to Dynamit-Aktiengesellschaft vormals Alfred Nobel & Co., Troisdorf, near Cologne, Germany.

Dyes, Stains, etc.

Production azo dyes: 3-benzoylamino-4-methoxybenzene-N = N-arylide of beta-hydroxy-naphthoic acid. No. 2,052,424. Wilfred Archibald Sexton, Blackley, Manchester, England, to Imperial Chemical Industries, Ltd., a corporation of Great Britain.

Production azo dyestuffs from diazotized 4-nitro-2-aminophenol-6-sulfonic acid and a monocyclic phenol. No. 2,052,477. Adolf Krehser, Riehen, near Basel, Switzerland, to J. R. Geigy A. G., Basel, Switzerland.

Patents digested include issues of the "Patent Gazette," August 25 through September 15 inclusive.

Production dyestuffs of the anthraquinone acridone series. No. 2,052,592. Alex. J. Wuerzt, Carrollville, and Myron S. Whelen, Milwaukee, Wis., to du Pont, Wilmington, Del.

Production compounds of basic dyestuffs with sulfuric acid ester salts. No. 2,052,716. Samuel Lenher to du Pont, both of Wilmington, Del.

Preparation metalliferous hydroxyquinoline azo dyestuffs. No. 2,052,833. Hans Krzikalla and Walter Limbacher, Ludwigshafen-am-Rhine, Germany, to General Aniline Works, Inc., New York City.

Preparation dyestuff mixtures containing an azobenzanthrone-alpha-aminoanthraquinone and at least one other organic dyestuff, the latter being insoluble to reducing agents. No. 2,053,041. Joachim Mueller, Ludwigshafen-am-Rhine, Germany, to General Aniline Works, Inc., New York City.

Preparation color lake; reacting aluminum sulfate with sodium aluminate, subsequently adding a dye. No. 2,053,208. Francis J. Curtis, Belmont, Mass., to Merrimac Chemical Co., Everett, Mass.

Production dyestuffs of the anthraquinone series. No. 2,053,273. Geo. Holland Ellis and Frank Brown, Spondon, near Derby, England, to Celanese Corp. of America, a corporation of Del.

Production and use of dyestuffs (amino anthraquinone derivatives). No. 2,053,274. Geo. Holland Ellis and Frank Brown, Spondon, near Derby, England, to Celanese Corp. of America, a corporation of Del.

Manufacture and application of arylamino anthraquinone dyestuffs. No. 2,053,275. Geo. Holland Ellis and Frank Brown, Spondon, near Derby, England, to Celanese Corp. of America, a corporation of Del.

Coloring textiles; using in dyebath a water-insoluble arylamino anthraquinone. No. 2,053,276. Geo. Holland Ellis, Spondon, near Derby, England, to Celanese Corp. of America, a corporation of Del.

Coloring textiles comprising an organic derivative of cellulose, applying an anthraquinone compound. No. 2,053,277. Geo. Holland Ellis and Frank Brown, Spondon, near Derby, England, to Celanese Corp. of America, a corporation of Del.

Production vat dyes of the dibenzanthrone series. No. 2,053,308. Alex. John Wuerzt to du Pont, both of Wilmington, Del.

Production anthraquinone dyestuffs. No. 2,053,343. Frank Lodge and Henry Alfred Piggott, Blackley, Manchester, England, to Imperial Chemical Industries, Ltd., a corporation of Great Britain.

Production azo dyestuffs. No. 2,053,394. Detlef Delfs, Leverkusen-I. G. Werk, Germany, to General Aniline Works, Inc., New York City.

Dyeing preparations consisting of an acid dyestuff and a water-soluble salt of an organic compound; comprising at least one basic nitrogen atom and an aliphatic radical of at least 10 carbon atoms in a straight chain, dissolved in an organic solvent which dissolves basic dyestuffs. No. 2,053,616. Albert Landolt, Riehen, near Basel, Switzerland, to Society of Chemical Industry in Basle, Basel, Switzerland.

Production azo dyestuffs. Nos. 2,053,817-8. Friedrich Felix and Wilhelm Huber, Basel, Switzerland, to Society of Chemical Industry in Basle, Basel, Switzerland.

Production alkylated indazoles of high molecular weight. No. 2,053,822. Chas. Granacher, Basel, and Franz Ackermann, Binningen, near Basel, Switzerland, to Society of Chemical Industry in Basle, Basel, Switzerland.

Production azo dyestuffs. No. 2,054,056. Fritz Lange, Ludwigshafen-am-Rhine, Germany, to General Aniline Works, Inc., New York City.

Production azo dyestuffs containing chromium. No. 2,054,057. Fritz Lange, Ludwigshafen-am-Rhine, Germany, to General Aniline Works, Inc., New York City.

Preparation vat dyestuffs of the perylene series; trichloroperylene-tetracarboxylic acid diphenylid-imide. No. 2,054,334. Paul Nawiasky and Erich Berthold, Ludwigshafen-am-Rhine, Germany, to General Aniline Works, Inc., New York City.

Production azo dyestuffs and intermediates. No. 2,054,397. Carl Taube, Leverkusen-Wiesdorf, Germany, to General Aniline Works, Inc., a corporation of Delaware.

Production color prints by transferring a dyestuff from a printing matrix to an image ground. No. 2,054,261. Friedrich Lieng, Dresden, Germany, to Jasma A.-G., Zurich, Switzerland.

Production azo dyestuffs containing chromium. No. 2,054,489. Richard Stusser, Cologne-Deutz, Germany, to General Aniline Works, Inc., New York City.

Production chromium complex compounds. No. 2,054,490. Richard Stusser, Cologne-Deutz, Germany, to General Aniline Works, Inc., New York City.

Fine Chemicals

Production compound open chain allyl citrylidene acetone. No. 2,051,812. Henri Barbier, Geneva, Switzerland, to Givaudan-Delawanna, Inc., New York City.

Apparatus and process for production hydrogen peroxide. No. 2,051,951. Ferdinand Krauss, Brunswick, and Adolf Köpke, Leipzig, Germany.

Production ammonium salts of acetyl salicylic acid. No. 2,052,663. Pincus Rothberg, New York City, and Leo A. Flexser, Union City, N. J., to Montrose Chemical Co., Inc., Newark, N. J.

Manufacture aryl-arseno-arsenides of the benzene series. No. 2,052,670. Hans Schmidt, Wuppertal-Vohwinkel, Germany, to Winthrop Chemical Co., Inc., New York City.

Sensitizing silver halide emulsions. No. 2,052,754. Walter Dieterle and Robt. Walter, Dessau in Anhalt, Germany, and Hermann Durr, Binghamton, N. Y., to Agfa Ansco Corp., Binghamton, N. Y.

Preparation esters of tertiary butyl acetic acid. No. 2,052,995. Frank C. Whitmore, State College, Pa., and August H. Homeyer, St. Louis, Mo., to Mallinckrodt Chemical Works, St. Louis, Mo.

Manufacture esters of aliphatic acids. No. 2,053,029. Henri Martin Guinot to Usines de Melle, both of Melle, Deux-Sevres, France.

Production cemented tantalum carbide. No. 2,053,151. Floyd C. Kelley to General Electric Co., both of Schenectady, N. Y.

Manufacture aliphatic primary amines. No. 2,053,193. Henri Martin Guinot, Niort, Deux-Sevres, France, to Usines de Melle, Melle, France.

Process making a phthalic halide. No. 2,053,269. Melvin A. Dietrich, Wilmington, Del., and Carl S. Marvel, Urbana, Ill., to du Pont, Wilmington, Del.

Catalytic hydrogenation of the ketonic structures of aroyl aromatic carboxylic acids. No. 2,053,430. Geo. Dewitt Graves, to du Pont, both of Wilmington, Del.

In purification of ether the method of reducing the aldehyde content from less than 100 pts. per million to less than 10 pts. per million, which comprises contacting ether with a bisulfite solution containing a non-volatile water-miscible alcohol. No. 2,053,439. Ferdinand W. Nitardy, Brooklyn, N. Y., to E. R. Squibb & Sons, New York City.

Production fine-grain photographic developer containing an M-Q developing agent and ammonium chloride. No. 2,053,516. John I. Crabtree and Paul W. Vittum to Eastman Kodak Co., all of Rochester, N. Y.

Regenerating photographic fixing baths; by addition to bath of a soluble thallous salt. No. 2,053,525. Karl Kieser, Beuel-am-Rhine, Germany.

Production agents for stabilizing peroxide solutions; pyrophosphoric acid esters of higher aliphatic alcohols. No. 2,053,653. Karl Butz, Chemnitz, Saxony, Germany, to American Hyalcol Corp., Wilmington, Del.

Process preserving cream by addition hydrogen peroxide in amounts based on weight of the cream, then heating. No. 2,053,740. Jos. S. Reichert, Robt. W. McAllister, and Wilbie S. Hinegardner, Niagara Falls, N. Y., to du Pont, Wilmington, Del.

Manufacture of o-and peri-aryl dinitriles. No. 2,054,088. Reginald Patrick Linstead and Arthur Reginald Lowe, So. Kensington, London, England, to Imperial Chemical Industries, Ltd., London, England.

Manufacture esters of methacrylic acid. No. 2,054,242. Wesley Cocker, John Stanley Herbert Davies, and Rowland Hill, Blackley, Manchester, England, to Imperial Chemical Industries, Ltd., a corporation of Great Britain.

Production thiazyl esters of dithiocarbamic acids. No. 2,054,453. Jan Teppema, Cuyahoga Falls, Ohio, to Wingfoot Corp., Wilmington, Del.

Preparation an N-docosyl substituted amide of an aliphatic monocarboxylic acid wherein the acyl radical contains 20 or more carbon atoms. No. 2,054,638. Erik Schirm, Dessau-Anhalt, Germany, to Deutsche Hydrierwerke Aktiengesellschaft, Berlin-Charlottenburg, Germany.

Production an organic basic bismuth salt soluble in oil; effecting a double decomposition between a basic bismuth compound and an alkali salt of a mono-alkyl ester of cyclohexane-1,1-diacetic acid. No. 2,054,731. Frank Lee Pyman and Alexander Peter Tawse Easson, to Boots Pure Drug Co., Ltd., all of Nottingham, England.

Preparation a dentrifice containing a soluble salt of a sulfuric acid ester of a higher aliphatic alcohol. No. 2,054,742. Eberhard Eibel, Dusseldorf, Germany, to International Scientific Products Co., Chicago, Ill.

Glass and Ceramics

Improved glass tempering method. No. 2,052,254. Wm. W. Shaver to Corning Glass Works, both of Corning, N. Y.

Manufacture laminated glass. No. 2,052,286. Robert H. du Bois, Jeannette, Pa., to American Window Glass Co., Pittsburgh, Pa.

Apparatus for manufacture laminated glass. No. 2,052,545. Frederic L. Bishop, Fox Chapel Manor, Lonnie J. Pierce, Pittsburgh, and Chas. F. Wood, Chas. S. Shoemaker, and Edeo Donini, all of Jeannette, Pa., to American Window Glass Co., Pittsburgh, Pa.

Manufacture laminated glass, comprising sheets of glass united by zein plasticized with an aromatic-alkylated-sulfonamide. No. 2,054,108. Jas. F. Walsh, Newton Center, Mass., to Arthur D. Little, Inc., Cambridge, Mass.

Industrial Chemicals, Apparatus, etc.

Foam producing apparatus. No. 2,051,841. Victor Geo. Wm. Gilbert, London, England, to American-LaFrance-Foamite Corp., a corporation of New York.

Production barbituric acid. No. 2,051,846. Paul Halbig and Felix Kautler, to Dr. Alex. Wacker, Gesellschaft fur Elektrochemische Industrie, G. m. b. H., all of Munich, Germany.

Manufacture friction elements wherein an asbestos fibrous base is saturated with an oxidizable binder. No. 2,051,888. Izador J. Novak, to Raybestos-Manhattan, Inc., both of Bridgeport, Conn.

Apparatus for treating granular material with a reagent gas. No. 2,051,962. Thos. A. Mitchell to Hughes-Mitchell Processes, Inc., both of Denver, Colo.

Method inducing formation of mullite crystals in a fired silica-alumina article at low temperatures. No. 2,051,964. Chas. L. Norton, Jr., Boston, Mass., to Babcock & Wilcox Co., Newark, N. J.

Preparation soils for clarifying liquids. No. 2,051,983. Curtis Quincy McWilliams Campbell, Pittsburgh, Pa.

Process separating mixed materials. No. 2,052,004. Walter L. Remick, Hazleton, Pa., to Hydrotator Co., Cleveland, Ohio.

Production a non-alkaline emulsion comprising oleaginous and aqueous materials and a minor proportion of a hydrophilic lipin. No. 2,052,025. Benjamin R. Harris, Chicago, Ill.

Production an emulsion comprising oleaginous and aqueous materials, and a higher aliphatic ether of a polyhydric alcohol. No. 2,052,026. Benjamin R. Harris, Chicago, Ill.

Production sulfuric acid ester of a branched chain octyl alcohol. No. 2,052,027. Benjamin R. Harris, Chicago, Ill.

Preparation phosphoric acid esters. No. 2,052,029. Benjamin R. Harris, Chicago, Ill.

Method converting butylic olefines and water vapor direct into the corresponding alcohols. No. 2,052,095. Walter Philip Joshua, Cheam, Herbert Muggleton Stanley, Tadworth, and John Blair Dymock, Sutton, England.

Preparation stable carbamic acid chlorides; by combining them with halogen compounds of the Friedel-Crafts' catalysts type. No. 2,052,138. Heinrich Hopff and Helmut Ohlner, Ludwigshafen-am-Rhine, Germany, to I. G., Frankfurt-am-Main, Germany.

Means for impelling and compressing gaseous fluids. No. 2,052,155. Jacob W. Woodruff, ten per cent. to Frank M. Strook and forty per cent. to Cora L. Selzer, all of Cleveland, O.

Separation saponifiable from unsaponifiable compounds. No. 2,052,165. Fgbert W. Carrier and Edward Duer Reeves, Baton Rouge, La., to Standard Oil Development Co., a corporation of Delaware.

Powdered coloring material for coloring fatty materials; comprising an oil soluble dye and finely divided anhydrous dextrose. No. 2,052,175. Carl H. Haurand, No. Plainfield, N. J., to Best Foods, Inc., New York City.

Boric acid esters of organic compounds. No. 2,052,192. Henry Alfred Piggott, Cheadle Hulme, England, to Imperial Chemical Industries, Ltd., a corporation of Great Britain.

Production sulfur-containing abietyl compounds; reaction product of abietic acid and hydrogen sulfide. No. 2,052,210. Jos. N. Borglin, Wilmington, and Emil Ott, Elsmere, Del., to Hercules Powder Co., Wilmington, Del.

Process differential froth flotation of sulfide minerals. No. 2,052,214. Frederic A. Brinker, Denver, Colo.

Production soya flour with changed flavor; comprising soaking whole unshelled soy beans in weakly acidulated water. No. 2,052,215. Martin Cohn, Berlin-Friedenau, Germany, to M. Neufeld & Co., Berlin, Germany.

Preparation silica for glass batches; introducing silica into acid solution; adding flotation oil (sulfur derivative of cresol), and agitating in flotation apparatus to float off iron impurities. No. 2,052,227. Harrison P. Hood to Corning Glass Works, both of Corning, N. Y.

Production dichlorodisopropyl ether. No. 2,052,264. Jacob N. Wickert, Charleston, W. Va., to Union Carbide & Carbon Corp., New York City.

Method froth flotation. No. 2,052,274. Frederic A. Brinker, Denver, Colo.

- Production carbon bisulfide. No. 2,052,297. Carl Iddings, Staten Island, N. Y., to General Chemical Co., New York City.
- Treatment corn starch to prevent development of rancidity. No. 2,052,308. Ralph W. Kerr, Riverside Ill., to International Patents Development Co., Wilmington, Del.
- Method bleaching starch. No. 2,052,320. Otto A. Sjostrom, Chicago, Ill., to International Patents Development Co., Wilmington, Del.
- Apparatus for synthesizing ammonia. No. 2,052,326. Georg Friedrich Uhde, Bovinghausen, Germany, to American Cyanamid & Chemical Corp., New York City.
- Apparatus and process for granulating fine material by adhesion to moistened nuclear fragments. No. 2,052,329. Helmut Wendeborn, Frankfurt-am-Main, Germany, to American Lurgi Corp., New York City.
- Manufacture sodium cyanide. Nos. 2,052,417-8. Ernest C. Moffett, Woodbridge, N. J., to American Cyanamid Co., New York City.
- Production anhydrous calcium sulfate product possessing a white color of high intensity. No. 2,052,436. Davidson Charlton Wysor, Ridgewood, N. J., to General Chemical Co., New York City.
- Production sodium aluminate; adding sodium hydroxide to an aqueous solution of aluminum sulfate, adding anhydrous alcohol, removing sodium sulfate from the alcoholic solution of sodium aluminate, and separating the latter by distillation. No. 2,052,486. Oscar Adolph Olsen, Little Rock, Ark.
- Water softening apparatus. No. 2,052,515. Eric Pick, New York City, to Permutit Co. (1934), Wilmington, Del.
- Method conditioning acid sludge. No. 2,052,544. Frank J. Bartholomew, Westfield, N. J., to Chemical Construction Corp., New York City.
- Production amine salts of aromatic sulfonic acids. No. 2,052,586. Geo. R. Tucker, No. Andover, Mass., to Dewey & Almy Chemical Co., No. Cambridge, Mass.
- Electrically heated apparatus and method of operating. No. 2,052,649. Geo. Anthony Patterson, Buffalo, N. Y., to National Aniline & Chemical Co., New York City.
- Preparation acetonylacetone; heating to boiling 2,5-dimethylfuran under atmospheric pressure in presence of a dilute aqueous solution of sulfuric acid of a concentration not greater than about 4%. No. 2,052,652. Granville A. Perkins and Walter J. Toussaint, Charleston, W. Va., to Union Carbide & Carbon Corp., New York City.
- Conversion high boiling point hydrocarbons into low boiling point products. No. 2,052,721. Ernest A. Ocon, New York City.
- Conversion and separation pine oil into its constituents and their derivatives. No. 2,052,742. Carlisle H. Bibb to Newport Industries, Inc., both of Pensacola, Fla.
- Production pure terpineol by distilling a crude terpineol containing oil in presence of an alkali which will react with a phenol. No. 2,052,743. Carlisle H. Bibb to Newport Industries, Inc., both of Pensacola, Fla.
- Conversion methyl chavicol into anethol by heating same in presence of dry, finely divided caustic alkali at temperatures sufficient to effect isomerization. No. 2,052,744. Carlisle H. Bibb to Newport Industries, Inc., both of Pensacola, Fla.
- Purification anethol; washing crude anethol obtained by isomerization of methyl chavicol with a caustic alkali solution. No. 2,052,745. Carlisle H. Bibb to Newport Industries, Inc., both of Pensacola, Fla.
- Acid treatment of oils. No. 2,052,852. David Dewey Stark, Berkeley, Calif., and Thos. Oliver Edwards, Jr., Associated, Calif., to Associated Oil Co., San Francisco, Cal.
- Device for introducing liquids into pressure vessels. No. 2,052,855. Lee S. Twomey, Vista, Calif.
- Process and product for stabilizing unsaturated hydrocarbons. Nos. 2,052,859-860. Chas. P. Wilson, Jr., Houston, Tex.
- Purification of alcohols. No. 2,052,881. Kenneth H. Klipstein, Short Hills, and Arthur A. Ticknor, Plainfield, N. J., to Calco Chemical Co., Inc., Bound Brook, N. J.
- Removal fibrous layers from surfaces with an adhesive, prepared by mixing dry bentonite, methyl alcohol, sulfonated pine oil, sodium salt of sulfonated lauryl alcohol, and a coloring material to form a pasty mass, afterwards adding mixture to water. No. 2,052,884. Martin Leatherman, Hyattsville, Md.
- Treatment fibrous materials to render them impermeable and fireproof, first step being impregnation with zinc stearate. No. 2,052,886. Yvonne Aimee Raymonde Leroy, Asnieres, France, to Brick Trust, Ltd., London, England.
- Preparation addition compound of aluminum chloride-dimethyl ether. No. 2,052,889. Donald J. Loder and Kenneth E. Walker to du Pont, all of Wilmington, Del.
- Recovery of sulfur from its combinations with hydrogen or oxygen. No. 2,052,892. Wallace J. Murray, Reading, Mass., to Arthur D. Little, Inc., Cambridge, Mass.
- Process dehydrating colloid material. No. 2,052,909. Mathieu van Roggen, Sprimont, and Leo Robin, Brussels, Belgium.
- Manufacture cymene and toluene from terpenes. No. 2,052,917. Hilding Olof Vidar Bergstrom, Stocksund, near Stockholm, and Karl Nicolaus Cederquist and Karl Gustaf Trobeck, Stockholm, Sweden.
- Process and apparatus for analyzing gases. No. 2,052,946. Hugo Semrau, Pittsburgh, Pa., to Bacharach Industrial Instrument Co., a corporation of Pa.
- Preparation soluble starch by the reaction of at least one hypohalogenite. No. 2,053,012. Johannes Hendrik van der Meulen, Arnhem, Netherlands.
- Conversion starch into soluble starch by heating with a mixture of a hypobromite and a hypochlorite in an aqueous medium. No. 2,053,013. Johannes Hendrik van der Meulen, Arnhem, Netherlands.
- Compound and method for conditioning boiler, steam, and condensate systems, using an alkaline, water-soluble, volatile, non-aromatic amine in process. No. 2,053,024. Morris E. Dreyfus to Western Chemical Co., both of Kansas City, Mo.
- Producing resin from trees by treating wound in tree bark with intensive short stimulation with a chemical agent. No. 2,053,031. Max Hessenland, Konigsberg, Helmut Kublun, Gumbinnen, and Hans Splitter, Stralsund, Germany.
- Manufacture anhydrous sodium sulfate. No. 2,053,066. Geo. Lewis Cunningham, Niagara Falls, N. Y., to Mathieson Alkali Works, New York City.
- Process coating an electron emitter. No. 2,053,090. Harold M. Lang and Alvin H. Rosenbaum to Sigmund Cohn, all of New York City.
- Process and apparatus for analyzing gases. No. 2,053,121. Louis L. Vayda, Aspinwall, Pa., to Bacharach Industrial Instrument Co., a corporation of Pa.
- Thermal decomposition of fluoro compounds. No. 2,053,174. Harold Simmons Booth, Cleveland Heights, O.
- Manufacture composite insulating article carrying a cellular backing of porcelain enamel. No. 2,053,244. Karl Turk, Riderwood, Md.
- Process treating zinc oxide. No. 2,053,249. Hugo Reinhard, Oberhausen, Germany, to Wilhelm Grillo Handelsgesellschaft, m.b.H., Hamburg, Germany.
- Method facilitating production of wells. No. 2,053,285. John J. Grebe to Dow Chemical Co., both of Midland, Mich.
- Manufacture calcium phosphates. No. 2,053,266. Harry A. Curtis, Knoxville, Tenn., to TVA, Wilson Dam, Ala.
- Preparation ketene by pyrolysis of a ketene-forming substance. No. 2,053,286. Crawford Hallock Greenewalt, Wilmington, Del., to du Pont Rayon Co., New York City.
- Purifying treatment for alkali metal phosphate solutions. No. 2,053,319. Louis Block and Max Metzger to Blockson Chemical Co., all of Joliet, Ill.
- Treatment clays, etc., in the wet state with a soluble chromous salt, to improve their color. No. 2,053,329. Wm. Feldenheimer, London, England.
- Manufacture abrasive coated articles; first sprinkling loose abrasive grains having individual non-tacky films of a plasticizable binder onto a flexible moving web. No. 2,053,360. Raymond C. Benner and Romie L. Melton to Carborundum Co., all of Niagara Falls, N. Y.
- Manufacture abrasive coated fabrics. No. 2,053,361. Raymond C. Benner and Romie L. Melton, to Carborundum Co., all of Niagara Falls, N. Y.
- Production sulfonic acid derivatives of higher alcohols; treating an inorganic acid ester of said alcohols with a water soluble sulfite in presence of an organic base and a phosphate. No. 2,053,424. Alfred Davidson, Blackley, Manchester, England, to Imperial Chemical Industries, Ltd., a corporation of Great Britain.
- Preparation higher alkyl borates and silicates. No. 2,053,474. Geo. Dewitt Graves, Wilmington, Del., and James Herbert Werntz, Marshallton, Del., to du Pont, Wilmington, Del.
- Production nitrates of a metal of the cobalt type. No. 2,053,518. Eugene Dwight Crittenden, Syracuse, N. Y., to Atmospheric Nitrogen Corp., New York City.
- Process refining impure triphenyl phosphate to obtain a clear solution of pure plasticizer. No. 2,053,532. Marvin J. Reid to Eastman Kodak Co., both of Rochester, N. Y.
- Manufacture regenerative compound coke-ovens. No. 2,053,573. Wilhelm Mueller, Gleiwitz, Germany.
- Separation carbon dioxide from gaseous mixtures free from sulfur compounds. No. 2,053,650. Hans Bachr and Helmut Mengdehl, Ludwigshafen-am-Rhine, Germany, to I. G., Frankfurt-am-Main, Germany.
- Preparation reaction products of alkylene oxides and alcohols. No. 2,053,708. Harvey R. Fife, Pittsburgh, Pa., to Union Carbide & Carbon Corp., New York City.
- Manufacture a volatile organic compound by fermentation of a carbohydrate material. No. 2,053,769. Henry Dreyfus, England.
- Removal from a fermenting medium of organic compounds produced by the fermentation. No. 2,053,770. Henry Dreyfus, England.
- Process for simultaneous production of sulfuric and nitric acids. No. 2,053,834. Pierre Kachkaroff, Chatillon-sous-Bagneux, and Camille Matignon, Paris, France.
- Catalytic production of aldehydes from a mixture of a volatile unsaturated compound. No. 2,053,845. Otto Schmidt, Karl Huttner, and Georg Kaeb, Ludwigshafen-am-Rhine, Germany, to I. G., Frankfurt-am-Main, Germany.
- Preparation gas purifying material, comprising iron oxidized in situ on particles previously formed by spraying water on molten blast furnace slag. No. 2,053,960. Theo. P. Keller, Flushing, N. Y., to Gas Purifying Materials Co., Inc., Long Island City, N. Y.
- Substitute for butter to be used in tropical regions; consisting of refined mineral oil of the medicinal type, deodorized hydrogenated vegetable oil of high melting point, and oil-ground salt in the finely divided state. No. 2,054,072. Carleton Ellis to Ellis-Foster Co., both of Montclair, N. J.
- Production of carbon black by the thermal dissociation of organic materials. No. 2,054,084. John J. Jakosky, Los Angeles, Calif., to Electrolacks, Inc., Culver City, Calif.
- Reagent distributor. No. 2,054,087. Walter F. Knebusch, Cleveland, and Foster Hillix, Lakewood, Ohio, to Industrial Rayon Corp., Cleveland, Ohio.
- Process treating oleaginous materials containing a mixture of volatile fatty acids having different boiling points. No. 2,054,096. Ralph H. Potts, Chicago, and John E. McKee, Western Springs, Ill., to Armour & Co., Chicago, Ill.
- Preparation polycyclic aromatic monocarboxylic acids; e.g. 4-carboxy phenanthrene, a white, crystalline acidic substance having M.P. of about 220°C., and a neutralization equivalent of 222. No. 2,054,100. Norman D. Scott and Joseph Fredric Walker, Niagara Falls, N. Y., to du Pont, Wilmington, Del.
- Manufacture acetyl retene; reacting upon retene, in dry nitrobenzene solution, with acetyl chloride, in presence of anhydrous aluminum chloride. No. 2,054,107. Eric Wahlforss, Cleveland, O., and Leo A. Goldblatt, Erie, Pa., to Glidden Co., Cleveland, Ohio.
- Highly elastic upholstery stuffings, comprising fibrous materials impregnated with a polymerization product of a polymerized aliphatic vinyl compound. No. 2,054,131. Leo Kollek, Ludwigshafen-am-Rhine, Germany, to I. G., Frankfurt-am-Main, Germany.
- Preparation a non-corrosive liquid suitable for use in heat exchange devices, etc., containing iron and copper-bearing metals. No. 2,054,282. Richard G. Clarkson, Wilmington, Del., and Chas. J. Pedersen, Penns-grove, N. J., to du Pont, Wilmington, Del.
- Process stabilizing a caustic soda solution of hydroxy cellulose ether, tending to gel after standing at most for a few hours. No. 2,054,299. Geo. A. Richter to Brown Co., both of Berlin, N. H.
- Process for preservation cellulose xanthate. No. 2,054,300. Geo. A. Richter to Brown Co., both of Berlin, N. H.
- Method of effecting the addition of sodium to naphthalene; reacting the two in a reaction medium comprising ethylene glycol methyl ethyl ether. No. 2,054,303. Norman D. Scott, Sanborn, N. Y., to du Pont, Wilmington, Del.
- Production a bonded product with long temperature range binders. No. 2,054,356. Willis A. Boughton, Cambridge, Mass., and Wm. R. Mansfield, Boston, Mass., to New England Mica Co., Waltham, Mass.
- Production aqueous emulsion comprising water, an oil-like material, a fatty alcohol, and a quaternary ammonium salt containing an acid radical having at least 8 carbon atoms in the chain. No. 2,054,257. Richard Hueter, Rossau Anhalt, Germany, to Deutsche Hydrierwerke Aktien-gesellschaft, Berlin-Charlottenburg, Germany.
- Method dehydrating Glauber's salt. No. 2,054,520. Jas. B. Pierce, Jr., to Barium Reduction Corp., both of Charleston, W. Va.
- Froth flotation device. No. 2,054,539. Gregoire Gutzeit, Geneva, Switzerland, to Edouard d'Orelli, Zurich, Switzerland.
- Acidproof tank comprising a shell of sheet steel lined with an unbroken lining of lead, a further self-supporting lining for said shell composed of acidproof bricks set up with sulfur cement, said lining being sufficiently thick to protect the lead against injuries and sudden temperature changes. No. 2,054,587. Richard Neuhaus, to Nukem Products Corp., both of Buffalo, N. Y.
- Manufacture meat curing mass; comprising treatment with a mixture of a nitrite and a nitrate selected from the sodium and potassium group. No. 2,054,623. Enoch L. Griffith to Griffith Labs., both of Chicago, Ill.

Salt curing process for meats using sodium chloride. Nos. 2,054,624-5. Enoch L. Griffith to Griffith Labs., Inc., both of Chicago, Ill.

Method curing meat; using salt mixture containing proportions of nitrate and nitrite of alkali metal fused together. No. 2,054,626. Enoch L. Griffith to Griffith Labs, Inc., both of Chicago, Ill.

Meat curing composition; using sodium chloride in process. No. 2,054,646. Hugh E. Allen, Evanston, Ill.

Production compression ignition fuel comprising a high boiling fuel oil of the type used for Diesel engines and two separate compounds, one ethyl nitrate and the other an oxygenated organic compound of copper. No. 2,054,628. Donald Albert Howes, Norton-on-Tees, England, to Imperial Chemical Industries, Ltd., a corporation of Great Britain.

Treatment of carbonaceous material. No. 2,054,725. Chas. Jason Greenstreet, London, England.

Process destructive hydrogenation of carbonaceous materials rich in asphalts or substances which produce asphalt during the treatment. No. 2,054,776. Mathias Pier, Heidelberg, Bruno Engel, Mannheim, and Walter Kroenig, Ludwigshafen-am-Rhine, Germany, to Standard-I. G. Co., Linden, N. J.

Leather and Tanning

Improved method manufacturing velvet leathers; which includes filling grain portion of an untanned skin with a fine powder. No. 2,054,069. John J. Callahan, Peabody, Mass., to Turner Tanning Machinery Co., Portland, Me.

Metals, Alloys, Ores

Treatment magnesium vapors in admixture with gas. No. 2,051,863. Frank R. Kemmer, Larchmont, N. Y., to American Magnesium Metals Corp., Pittsburgh, Pa.

Recovery magnesium metal from magnesium vapors containing CO. No. 2,051,913. Robt. Suchy, Bitterfeld, Germany, to Magnesium Development Corp., a corporation of Delaware.

Apparatus for electrodeposition. No. 2,051,928. Chas. E. Yates, Perth Amboy, N. J., to Anaconda Copper Mining Co., New York City.

Production rivet of an ingot steel alloy containing carbon, manganese, silicon, copper, and iron; having tensile st. at least 50 kg. per sq. mm., yield pt. at least 40 kg. per sq. mm., and notch-bar tenacity at least 10 mkg. per sq. cm. No. 2,051,937. Herbert Buchholtz, Dortmund, Germany, to Vereinigte Stahlwerke Aktiengesellschaft, Dusseldorf, Germany.

Treatment beryllium and its alloys. No. 2,051,963. Chas. H. Monroe and Harry C. Claffin, St. Clair, Mich., to Beryllium Corp., New York City.

Production sintered hard metal alloys. No. 2,051,972. Kjell Magnus Tigerschild, Stockholm, and Karl Bonthron, Fagersta, Sweden.

Production steel resistant to stress and to scaling at elevated temperatures, containing carbon, manganese, silicon, molybdenum, and iron. No. 2,051,991. Wm. R. Fleming to Andrews Steel Co., both of Newport, Ky.

Manufacture cast iron; in one step titanium is added to molten iron and is subsequently oxidized. No. 2,052,107. Allan Leslie Norbury, Birmingham, and Edwin Morgan, Wyde Green, near Birmingham, England, to British Cast Iron Research Ass'n, Birmingham, England.

Production stainless ferrous alloy having improved machinability without substantially impaired forgeability, consisting of carbon, chromium, silicon, manganese, phosphorus, sulfur, and iron. No. 2,052,136. James P. Gill to Vanadium-Alloys Steel Co., both of Latrobe, Pa.

Production fabricated structure, comprising an alloy of copper, manganese and zinc worked into shaped members and welded together to form the structure. No. 2,052,139. Herbert C. Jennison, Bridgeport, Conn., to American Brass Co., Waterbury, Conn.

Manufacture fabricated structure, composed of an alloy of manganese, copper, silicon, and zinc worked into shaped members and welded together to form the structure. No. 2,052,140. Herbert C. Jennison, Bridgeport, Conn., to American Brass Co., Waterbury, Conn.

Production a homogeneous tarnish-resisting silver-tin alloy. No. 2,052,142. Edward F. Kern to American Metal Co., Ltd., both of New York City.

Production a tarnish-resisting silver alloy consisting of silver, silicon, and tin. No. 2,052,143. Edward F. Kern to American Metal Co., Ltd., both of New York City.

Separation aluminum oxide from raw material. No. 2,052,236. Karl Helge Sigfrid Lofquist, Stockholm, Sweden.

Production a soldering flux. No. 2,052,278. Conral C. Callis and Ralph B. Derr, Oakmont, Pa., to Aluminum Co. of America, Pittsburgh, Pa.

Protection metal surfaces from corrosion. No. 2,052,363. Francis H. Snyder, Niagara Falls, N. Y., and F. M. Maclaren, Niagara Falls, Ont., Canada, to Industrial Research, Ltd., Niagara Falls, Ont., Canada.

Treatment indium-bearing materials. No. 2,052,387. Homer M. Doran, Great Falls, Mont., to Anaconda Copper Mining Co., New York City.

Flux for coating arc welding electrodes having binder of ethyl orthosilicate. No. 2,052,400. March R. Mortiz, Sale Moor, and Thos. C. R. Shepherd, Manchester, England, to General Electric Co., Schenectady, N. Y.

Apparatus for concentrating ores. No. 2,052,431. Henry H. Wade, Hopkins, Minn.

Production hot and cold workable, freely machinable, copper-base alloys of high tensile strength, yield point and ductility. No. 2,052,523. Richard A. Wilkins to Revere Copper & Brass, Inc., both of Rome, N. Y.

Covered electrode for arc welding. No. 2,052,699. John J. Chyle, to A. O. Smith Corp., both of Milwaukee, Wis.

Manufacture alloy using cast iron, mild steel, and borax in process. No. 2,052,714. Friedrich Kempka, New York City, one-half to Edward Van Hoofstadt, No. Valley Stream, L. I., N. Y.

Ore concentrating device. No. 2,052,809. Philip H. Stevenson; one-third to Philip A. Witt and one-third to Geraldine A. Witt, all of Denver, Colo.

Simultaneous production of pig iron and Portland cement. No. 2,052,879. Ernst Karwat, Grosshesselohe, near Munich, Germany, to Union Carbide & Carbon Corp., New York City.

Tarnish-resistant, rustproof, and non-corrodible dairy utensil, composed of a high nickel ternary alloy comprising nickel, chromium, iron, and carbon. No. 2,053,097. Paul D. Merica to International Nickel Co., Inc., both of New York City.

Manufacture chrome ore refractory; first intimately mixing relatively coarse chrome ore with high-magnesia material. No. 2,053,146. Frederic A. Harvey and John S. McDowell to Harbison-Walker Refractories Co., all of Pittsburgh, Pa.

Production concentrates containing non-ferrous metals, including nickel and cobalt, which can be reduced under about the same conditions under which iron oxide is reduced. No. 2,053,149. Friedrich Johannsen, Magdeburg, Germany.

Electrode resistant to anodic attack. No. 2,053,214. Ralph C. Brown, Lakewood, O., to Union Carbide & Carbon Corp., New York City.

Apparatus for producing metallic powders. No. 2,053,222. James H. Lucas, Akron, O.

Welding rod coated with a bituminous material. No. 20,102. Reissue. Wilbur B. Miller, Niagara Falls, N. Y., to Union Carbide & Carbon Corp., New York City.

Cast roll for fabricating hot metal, having high resistance to thermal shock; composed of a ferrous alloy containing carbon, cobalt, chromium, and iron. No. 2,053,346. Wm. J. Merten to Pittsburgh Rolls Corp., both of Pittsburgh, Pa.

Process hot-coating molten metal upon a pre-heated metallic surface, latter being coated with a primary flux which is plastic enough to protect the surface and is viscous enough to maintain a protecting layer on a vertical wall of the surface. No. 2,053,408. Carl Pfanstiehl, Highland Park, Ill., to Pfanstiehl Chemical Co., Waukegan, Ill.

Method refining antimonyiferous lead, involving testing step of forming a sequence of test specimens until mirror bright flakes appear upon a free surface thereof on setting. No. 2,053,655. Louis S. Deitz, Jr., Metuchen, N. J., and Geo. W. Whitney, Huntington Park, Calif., to Western Electric Co., Inc., New York City.

Method refining lead and lead alloys. No. 2,053,656. Louis S. Deitz, Jr., Metuchen, N. J., to Nassau Smelting & Refining Co., New York City.

Manufacture a hot work tool from a steel containing carbon, chromium, manganese, molybdenum, nickel, and iron. No. 2,053,800. Fred. F. McIntosh, Glen Osborne, Pa., to Crucible Steel Co. of America, New York City.

Production steel and cast iron articles with reduced tendency to corrode. No. 2,053,846. Hermann Schulz and Carl Carius, Dortmund, Germany, to Vereinigte Stahlwerke Aktiengesellschaft, Dusseldorf, Germany.

In selenium cell manufacture, production a light-sensitive cell; first coating an insulating support with a colloidal suspension of a salt of a noble metal. No. 2,053,881. Cyril S. Treacy, Scarsdale, N. Y., to United Research Corp., Long Island City, N. Y.

Production aluminum-base alloy, characterized by resistance to oxidation between 600 and 1050°F. when exposed to said temperatures for periods up to about 20 hrs.; composed of aluminum, magnesium, silicon, and lithium. No. 2,053,924. Philip T. Stroup, New Kensington, Pa., to Aluminum Co. of America, Pittsburgh, Pa.

Production aluminum-base alloy, characterized by resistance to oxidation between 600 and 1050°F. when exposed to said temperatures for periods up to about 20 hrs.; composed of aluminum, magnesium, chromium, silicon, and lithium. No. 2,053,925. Philip T. Stroup, New Kensington, Pa., to Aluminum Co. of America, Pittsburgh, Pa.

Welding electrode having flux coating of mixture comprising titanium dioxide, sodium silicate glass, Vermont talc, asbestos, amorphous silica, gum arabic, metallic deoxidizer, liquid sodium silicate, and water. No. 2,053,956. Jos. H. Humberstone and Virdis Miller to General Electric Co., all of Schenectady, N. Y.

Sintered laminated tool tip having outer layer of tantalum carbide and cobalt; a foundation layer of tungsten carbide and cobalt; and an intermediate layer of tungsten carbide, tantalum carbide, and cobalt. No. 2,053,977. Geo. F. Taylor to General Electric Co., both of Schenectady, N. Y.

Electrode for arc welding magnesium and its alloys, comprising a magnesium core and a metal sheath. No. 2,054,054. Donald E. Jarman to Dow Chemical Co., both of Midland, Mich.

Method of treating a complex lead and zinc sulfide ore which has a high lead content; using a chloridizing agent during process. No. 2,054,226. Thos. A. Mitchell to Hughes-Mitchell Processes, Inc., both of Denver, Colo.

Purification of an alkali metal containing small amounts of alkaline earth. No. 2,054,316. Harvey N. Gilbert, Niagara Falls, N. Y., to du Pont, Wilmington, Del.

Protection light metals; by coating same with a protective layer containing chlorinated rubber, having interposed between a layer containing a polymerization product of such polymerizable carboxylic acid derivatives as contain the grouping $\text{CH}_2=\text{C}=\text{}$. No. 2,054,389. Leo Rosenthal, Leverkusen-Wiesdorf, and Reinhard Hebermehl, Cologne-Deutz, Germany, to I. G. Frankfurt-am-Main, Germany.

Production zinc alloys having greater hardness than zinc, approximately the same ductility, and capable of being rolled, stamped, and deep drawn; composed of zinc, copper, and chromium. No. 2,054,398. Leland E. Wemple, Chicago, Ill., and John R. Daesen, Wilkes Barre, Pa.

Production sound, strong, ductile, corrosion-resisting welds in steel containing chromium, nickel, and carbon. No. 2,054,405. Fred. M. Becket, New York City, and Russell Franks, Jackson Heights, N. Y., to Union Carbide & Carbon Corp., New York City.

Reduction of silicates other than alkaline earth metal silicates and the production of alloys of aluminum. No. 2,054,427. Gustaf Newton Kirsebom, Oslo, Norway, to Calloy, Ltd., London, England.

Apparatus for concentrating minerals by flotation. No. 2,054,643. Stanley Tucker, London, England, to Minerals Separation North American Corp., New York City.

Bronzing of copper and copper alloys; by application acid solution of water, hydrochloric acid, and copper sulfate; final treatment being stream of gas containing ammonium sulfide. No. 2,054,737. Adolf Brunner, Therwil, Switzerland, to Metallwerke A.-G. Dornach, Dornach-Basel, Switzerland.

Welding iron, steel, and alloys of same. No. 2,054,770. Kurt Kautz, Essen, Germany, to Fried. Krupp Aktiengesellschaft, Essen-am-Ruhr, Germany.

Naval Stores

Method of refining rosin. No. 2,054,432. Donald A. Lister, Brunswick, Ga., to Hercules Powder Co., Wilmington, Del.

Paper and Pulp

Machine for moistening, coating, and dusting powdered materials on the coated face of matrix sheets. No. 2,051,813. Leon Bellamy, Newton, Mass.

Apparatus and method for coating paper. No. 2,053,601. Orme E. Cheatham to International Paper Co., both of New York City.

Method coating paper, etc.; using a heated plastic composition of rubber and paraffin wax. No. 2,054,113. Allen Abrams and Charley L. Wagner, Wausau, Wis., to Marathon Paper Mills, Rothschild, Wis.

Apparatus and process for making paper. No. 2,054,212. John Buss to Provincial Paper, Ltd., both of Toronto, Ont., Canada.

Apparatus and method for manufacturing paper. No. 2,054,630. Ross C. Hurrey, Staten Island, N. Y., to International Paper Co., New York City.

Process making paper pulp; converting sodium sulfide into sodium hydroxide. No. 2,054,727. Harold Lundin and Wm. H. Bitner, Springfield, Ohio.

Petroleum and Petroleum Chemicals

- Production mercaptan through reaction organic sulfur compound. No. 2,051,806. Clyve Charles Allen, Berkeley, Calif., to Shell Development Co., San Francisco, Calif.
- Production thioethers and saturated hydrocarbons from mercaptans. No. 2,051,807. Clyve Charles Allen, Berkeley, Calif., to Shell Development Co., San Francisco, Calif.
- Treatment motor fuel comprising gasoline containing color-forming olefins and a small amount of a phenolate capable of inhibiting or substantially reducing the transformation of the olefins into colored bodies. No. 2,051,814. Wayne L. Benedict to Universal Oil Products Co., both of Chicago, Ill.
- Polymerization of olefins. No. 2,051,859. Vladimir Ipatieff and Vasil Komarevsky, to Universal Oil Products Co., all of Chicago, Ill.
- Treatment motor fuel. Nos. 2,051,871-2-3. Chas. D. Lowry, Jr., to Universal Oil Products Co., both of Chicago, Ill.
- Apparatus for compounding lubricating oils. No. 2,051,932. Clive Morris Alexander, Webster Groves, Mo.
- Process improving gasoline by treatment with hydrochloric acid. No. 2,051,939. Roland B. Day, Chicago, to Universal Oil Products Co., both of Chicago, Ill.
- Production petroleum products. No. 2,052,003. Orland M. Reiff, Woodbury, N. J., to Socony-Vacuum Oil Co., Inc., New York City.
- Process separating paraffin from fluid hydrocarbons. No. 2,052,124. Gustav Harry Andersson to Aktiebolaget Separator-Nobel, both of Stockholm, Sweden.
- Conversion heavy hydrocarbon oils into lower boiling point hydrocarbon products. No. 2,052,148. Ernest A. Ocon, New York City.
- Stabilizing dyed hydrocarbon liquids. No. 2,052,193. Nathaniel H. Rickles, Roselle, N. J., to Standard Oil Development Co., a corporation of Delaware.
- Production oxygenated organic compounds from olefins. No. 2,052,195. Helmuth G. Schneider and Julius V. Sommer, Elizabeth, N. J., to Standard Oil Development Co., a corporation of Delaware.
- Process treating hydrocarbon lubricating oils with phenol at high temperatures. No. 2,052,196. Reginald K. Stratford, Sarnia, Ont., Canada, to Standard Oil Development Co., a corporation of Delaware.
- Material for use in oil refining; doctor solution of PbO and impure rayon waste as it comes directly from the viscose process. No. 2,052,239. Ralph W. Miller, Barberton, O., to Pittsburgh Plate Glass Co., a corporation of Pa.
- Production valuable products from unsaturated compounds and hydrogen sulfide. No. 2,052,268. Evan Clifford Williams and Clyve Charles Allen, Berkeley, Calif., to Shell Development Co., San Francisco, Calif.
- Process for breaking petroleum emulsions. Nos. 2,052,281-2-3-4. Melvin De Groot, St. Louis, Mo., to Tretolite Co., Webster Groves, Mo.
- Selective cracking of hydrocarbons. No. 2,052,340. Jos. F. Donnelly, Lemont, Ill., to Donnelly Process Corp., Chicago, Ill.
- Conversion hydrocarbon oils. No. 2,052,518. Robt. F. Ruthruff, Hammond, Ind., to Standard Oil Co., Whiting, Ind.
- Catalytic hydration of propylenes. No. 2,052,806. Wm. H. Shiffler and Melvin M. Holm, Berkeley, Calif., to Standard Oil Co. of Calif., San Francisco, Calif.
- Process cracking petroleum oil to promote molecular rearrangement. No. 2,052,812. Justin F. Wait, New York City.
- Process fractionally precipitating mineral oils. No. 2,052,971. Merrell R. Fenske and Wilbert B. McCluer, State College, Pa., to Penn. Petroleum Research Corp., a corporation of Pa.
- Extraction of lubricating oils; mixing said stock with a solvent consisting of liquefied sulfur dioxide and at least one liquefied olefinic hydrocarbon having from 2 to 5 carbon atoms per molecule; and separately recovering an extract fraction and a raffinate fraction. No. 2,053,000. Ogden Fitz Simons and Frank Cutshaw Croxton, Hammond, Ind., to Standard Oil Company, Chicago, Ill.
- Lubricating oil, consisting of a mineral lubricating oil and an aliphatic nitrile having at least 6 carbon atoms to increase the oiliness of said mineral oil. No. 2,053,045. Anderson W. Ralston, Wm. O. Pool, and Jas. Harwood, to Armour & Co., all of Chicago, Ill.
- Penetrating oil; mixture of a mineral lubricant and an aliphatic nitrile having at least 6 carbon atoms. No. 2,053,046. Anderson W. Ralston, Wm. O. Pool, and Jas. Harwood, to Armour & Co., all of Chicago, Ill.
- Emulsifying asphalt by passing molten asphalt through a colloid mill together with water and dispersing agent while colloid mill is immersed in a liquid bath. No. 2,053,099. Jack Miscall, Rutherford, N. J., to Patent & Licensing Corp., New York City.
- Treatment hydrocarbon oil; making a lime in oil slurry. No. 2,053,209. Harold R. Snow, Neodesha, Kans., to Standard Oil Co. (Ind.), Chicago, Ill.
- Apparatus for heating hydrocarbon fluids. No. 2,053,211. Donald S. Villars, Nutley, N. J., to Standard Oil Co. (Ind.), Chicago, Ill.
- Treatment hydrocarbon oil. No. 2,053,213. Harold V. Atwell, White Plains, N. Y., to Gasoline Products Co., Inc., Newark, N. J.
- Method dewaxing petroleum stock by dissolving oil content of stock in 1,3 dichlor, 2 methyl propane, thereafter removing wax from the solution by filtration. No. 2,053,337. Leo D. Jones to Sharples Specialty Co., both of Philadelphia, Pa.
- Production cracked distillates of petroleum. No. 2,053,421. Robt. E. Burk and Herman P. Lankelma, Cleveland, O., to du Pont, Wilmington, Del.
- Removal oil from beta beta' dichlorethyl ether; using sulfuric acid in process. No. 2,053,457. Harry T. Bennett and Joel L. Burkitt to Mid-Continent Petroleum Corp., all of Tulsa, Okla.
- Treatment motor fuels to render them light stable and inhibit gum formation; adding thereto an aliphatic-amine salt of a hydroxy-aryl compound. No. 2,053,466. Fred B. Downing, Carneys Point, N. J., and Herbert W. Walker, Wilmington, Del., to Gasoline Antioxidant Co., Wilmington, Del.
- Refining mineral oil. No. 2,053,485. Hans Friedrich Lindeke and Bernard Suto Greensfelder, Martinez, Calif., to Shell Development Co., San Francisco, Calif.
- Method of making gasoline. Nos. 2,053,511-12. Harry T. Bennett, Tulsa, Okla., and LeRoy G. Story, Bronxville, N. Y., to Gasoline Antioxidant Co., Wilmington, Del.
- Separation wax from a wax-bearing oil. No. 2,053,552. Lyle Dillon, Los Angeles, and Claude E. Swift, Glendale, Calif., to Union Oil Co. of Calif., Los Angeles, Calif.
- Method and apparatus for distilling oils. No. 2,053,670. Wheaton W. Kraft, East Orange, N. J., to Lummus Co., New York City.
- Improved method of producing straight run petroleum distillates by distillation from sulfur-containing stocks. No. 2,053,752. Arnold C. Vobach, Whiting, and Leslie P. Foster, East Chicago, Ind., to Sinclair Refining Co., New York City.
- Production low pour point mineral oil composition; comprising a mineral oil and a small proportion of rugallic acid hexastearate. No. 2,053,853. Adrianus Johannes van Peski, Bussum, Netherlands, to Shell Development Co., San Francisco, Calif.
- Dewaxing distillate oils. No. 2,053,872. Samuel A. Montgomery, Wood River, Ill., to Standard Oil Co., Chicago, Ill.
- Removal sulfur compounds from petroleum distillates; by subjecting distillates to action of sodium ortho-plumbate. No. 2,053,909. Harold L. Kerr to Frank Gardner, both of Dallas, Tex.
- Refining mineral lubricating oil. No. 2,054,050. Louis A. Clarke, Fishkill, N. Y., to Texas Co., New York City.
- Solvent refining of hydrocarbon oil. No. 2,054,052. Francis X. Govers, Vincennes, Ind., to Indian Refining Co., a corporation of Maine.
- Apparatus and process for dewaxing oil. No. 2,054,075. Harmon F. Fisher to Union Oil Co. of Calif., both of Los Angeles, Calif.
- Solvent extraction of hydrocarbon oils. No. 2,054,295. David R. Merrill, Long Beach, Calif., to Union Oil Co. of Calif., Los Angeles, Calif.
- Method dewaxing wax-bearing oil. No. 2,054,416. Francis X. Govers, Vincennes, Ind., to Indian Refining Co., Lawrenceville, Ill.
- Process dewaxing hydrocarbon oils. Nos. 2,054,429-30. Edwin C. Knowles, Beacon, N. Y., to Texas Co., New York City.
- Apparatus and process for dewaxing oil. No. 2,054,273. Philip Subkow to Union Oil Co. of Calif., both of Los Angeles, Calif.
- Process and product for stabilizing unsaturated hydrocarbons. No. 2,054,276. Chas. P. Wilson, Jr., Houston, Texas.
- Manufacture high viscosity index oil of low pour test from viscous undewaxed cylinder stock derived from mixed base crude. No. 2,054,433. Robt. E. Manley, Beacon, N. Y., to Texas Company, New York City.
- Conversion of hydrocarbon gases. No. 2,054,599. Jesse A. Guyer, Bartlesville, Okla., to Phillips Petroleum Co., a corporation of Del.
- Apparatus for making high viscosity index lubricating oils. No. 2,054,613. Harry T. Bennett to Mid-Continent Petroleum Corp., both of Tulsa, Okla.
- Manufacture a corrosion-inhibiting top lubricating oil for internal combustion engines; homogeneously incorporating with said oil a small amount of a solution obtained by reacting a peroxide of a fixed alkali with an alcohol. No. 2,054,721. Carl Martin Clementson, Malmö, Sweden, to C. & S. Clementson, Malmö-Limhamn, Sweden.
- Refining of petroleum oils. No. 2,054,750. Eric B. Hjerpe, Pittsburgh, and Wm. A. Gruse, Wilkesburg, Pa., to Gulf Research & Development Co., Pittsburgh, Pa.
- Treatment hydrocarbon oils. No. 2,054,774. Robt. E. Manley and Walter Ullrich, Beacon, N. Y., to Texas Co., New York City.
- Dewaxing wax-bearing mineral oil; mixing oil with a solvent liquid comprising a dialkyl ether. No. 2,054,775. Ernest Frank Pevere, Beacon, N. Y., to Texas Co., New York City.
- Process recovering pressable wax from a crude petroleum oil containing wax constituents in pressable and non-pressable form. No. 2,054,777. John T. Ward, Westfield, N. J., to Gasoline Products Co., Inc., Newark, N. J.

Resins, Plastics, etc.

- Manufacture new conversion products from natural resins and esters. No. 2,052,073. Josef Binapfl, Krefeld-Uerdingen, Germany, to I. G. Frankfort-am-Main, Germany.
- Production a clear homogeneous artificial resin. No. 2,052,093. Herbert Honel to Beck-Koller & Co., Inc., both of Detroit, Mich.
- Core for plastic slab manufacture. No. 2,052,126. John G. Brush, Westfield, N. J., to American Cyanamid & Chemical Corp., New York City.
- Treating and impregnating wood with a stable petroleum resin. No. 2,052,172. Per K. Frolich, Elizabeth, N. J., to Standard Oil Development Co., a corporation of Delaware.
- Plastic forming apparatus. No. 2,052,343. David Irvin Du Bois, to Whitall Tatum Co., both of Millville, N. J.
- Machine for continuously molding plastic materials into pellets and the like. No. 2,052,449. Stanley L. Connell, Glendale, Calif.
- Preparation molding compositions from urea and solid polymeric aldehydes. No. 2,053,228. Otto Sussenguth, Erkner, near Berlin, Germany, to Bakelite Corp., New York City.
- Manufacture molding compositions from urea. Nos. 2,053,229-30. Otto Sussenguth, Erkner, near Berlin, Germany, to Bakelite Corp., New York City.
- Production plastics in which binder constitutes at least 75% protein, using a resinous aldehyde condensation product in curing process. No. 2,053,850. Oswald Sturken, Leonia, N. J., to Resinox Corp., New York City.
- Plastic composition for hot-press molding, comprising an inert filler and a binder for the filler. No. 2,054,053. Harry A. Hoffman, Bloomfield, N. J., to Bakelite Corp., New York City.
- Production synthetic resins which comprises polymerizing in the presence of a catalyst an epoxy compound in which the oxygen is linked to adjacent carbon atoms in a carbocyclic ring. No. 2,054,099. Henry S. Rothrock to du Pont, both of Wilmington, Del.
- Preparation molding composition composed of cumarone resin, coal tar pitch, and rubber, in approximately equal quantities, together with a filler. No. 2,054,243. Arthur B. Cowdery, Needham, Mass., to Barrett Co., New York City.
- Preparation plastic composition having high degrees of flexibility and toughness over a wide range of atmospheric temperatures, comprising a plastic base free from dryers. No. 2,054,285. Benjamin Foster, Phila., Pa.
- Method formulating a molded product. No. 2,054,454. Herman R. Thies and Theo. A. Riehl, Akron, Ohio, to Wingfoot Corp., Wilmington, Del.
- Manufacture a printing medium having a synthetic resin coating thereon. No. 2,054,620. Abraham L. Freedlander to Dayton Rubber Mfg. Co., both of Dayton, Ohio.
- Production artificial resins of enhanced purity of color by polymerization of the nitriles of acrylic acid or its α -alkyl substituted homologues or mixtures thereof. No. 2,054,740. John Wm. Croom Crawford, Eaglescliffe, England, to Imperial Chemical Industries, Ltd., London, England.

Rubber

- Manufacture rubber articles. Coating tacky rubber with dusting powder comprising mixture of a comminuted resin and zinc stearate. No. 2,051,849. Ezra Lloyd Hanna, No. Scituate, R. I., to Davol Rubber Co., a corporation of Rhode Island.
- In a spreading, extruding or like operation the method of preventing adhesion between an aqueous dispersion of an organic substance and a confining, and distributing or shaping member for such dispersion. No. 2,052,131. Francis R. Chappell, Passaic, N. J., to U. S. Rubber Co., New York City.
- Liquid coating compositions composed of volatile petroleum distillate

and dispersed therein an unoxidized condensation derivative of rubber. No. 2,052,391. Herbert A. Endres, Silver Lake, Ohio, to Wingfoot Corp., Wilmington, Del.

Production rubber derivatives; reacting rubber with the chloride of an amphoteric metal. No. 2,052,411. Stewart S. Kurtz, Jr., Merion, Pa., to Wingfoot Corp., Wilmington, Del.

Preparation condensation derivatives of rubber; which are decomposition products produced by the addition of water to metallic addition products of rubber. No. 2,052,423. Lorin B. Sebrell, Silver Lake, Ohio, to Wingfoot Corp., Wilmington, Del.

Method forming condensation derivatives of rubber, by treating rubber in solution in the presence of water with a condensing agent which is a halide of an amphoteric metal. No. 2,052,435. Geo. M. Wright, Akron, Ohio, to Wingfoot Corp., Wilmington, Del.

Manufacture microporous articles composed of an inner reinforcing material impregnated and coated with microporous rubber, by treating reinforcing material with a gelling solution and a latex compound. No. 2,052,490. Willard L. Reinhardt, Shaker Heights, and Leland E. Wells, Cleveland Heights, O., to Willard Storage Battery Co., Cleveland, O.

Rubber compounding material; method comprises blending coal tar pitch with stearic acid, mixing resultant blend with rubber to be compounded therewith, and milling mixture. No. 2,052,607. Arthur B. Cowdery, Needham, Mass., to Barrett Co., New York City.

Manufacture conversion products of rubber and of chlorinated and brominated products thereof. No. 2,052,672. Frederick Stanley Shadbolt, Darwen, Lancashire, England, to Walpamur Co., Ltd., London, England.

Removal rubber-containing material from metal surfaces by immersing article in sulfuric acid. No. 2,052,997. Frederick K. Bezenberger, Cleveland Heights, Ohio.

Manufacture rubber products; reacting rubber with a chlormethyl ether. No. 2,053,271. Harry Ben Dykstra to du Pont, both of Wilmington, Del.

Method compounding rubber. No. 2,053,530. Royce J. Noble, Malden, Mass., to Heveatex Corp., Melrose, Mass.

Preservation rubber; treating same with substance having formula $R_1-NH-R_2-NH-R_3$; wherein R_1 and R_3 are benzene nuclei, and R_2 is a para-phenylene group. No. 2,053,785. Waldo L. Semon, Silver Lake Village, Ohio, to B. F. Goodrich Co., New York City.

Method preserving rubber by treatment with a reaction product obtainable by reacting in presence of an alkaline inorganic catalyst equimolecular proportions of a diarylamine, an aliphatic aldehyde, and an aromatic mono hydroxide. No. 2,054,483. Geo. D. Martin, Nitro, W. Va., to Monsanto Chemical Co., St. Louis, Mo.

Apparatus for cleaning printing press rollers; rubber wiper attached thereto composed of a divinyl acetylene derivative synthetic rubber. No. 2,054,618. Benj. F. Ford to Dayton Rubber Mfg. Co., both of Dayton, Ohio.

Production rubber articles; vulcanized rubber having imbedded therein strengthening threads of desulfurized, unbleached rayon. No. 2,054,780. Rudolph S. Bley, Elizabethton, Tenn., to North American Rayon Corp., New York City.

Textile, Rayon

Manufacture artificial silk from viscose solutions and recovery by-products therefrom. No. 2,050,079. Reissue. Adrian J. L. Moritz and Jan J. Schilthuis, to American Enka Corp., all of Enka, N. C.

Production crepe twisted crepe threads of unsaponified and saponified cellulose ester filaments. No. 2,051,829. Wm. Alexander Dickie and Wm. Ivan Taylor, Spondon, near Derby, England, to Celanese Corp. of America, a corporation of Delaware.

Manufacture artificial silk, etc. No. 2,051,831. Henry Dreyfus, England.

Method removing tackiness of freshly spun yarn bodies of hydrated cuprammonium cellulose by treatment with an aqueous emulsion. No. 2,051,891. Walter Ostermann, Wuppertal-Barman, Germany, to American Benberg Corp., New York City.

Apparatus and method making pile fabric, using rubber coating to loops in process. No. 2,052,071. Xenia Banister, Braintree, England, to Nikita Strachovsky, Paris, France, and Jean Felix Paulsen, Viroflay, France.

Manufacture artificial threads, etc., from cellulose. No. 2,052,478. Leon Lilienfeld, Vienna, Austria.

Production and treatment artificial materials. No. 2,052,558. Henry Dreyfus, London, England.

Manufacture artificial yarns or filaments of subdued lustre; incorporating in a solution of an organic derivative of cellulose in an organic solvent a finely divided water-soluble sulfate. No. 2,052,590. Wm. Whitehead, Cumberland, Md., to Celanese Corp. of America, a corporation of Delaware.

Manufacture artificial materials. No. 2,052,609. Henry Dreyfus, London, and Wm. Ivan Taylor, Spondon, near Derby, England, to Celanese Corp. of America, a corporation of Delaware.

Process stripping color from textiles dyed with azo dyes. No. 2,052,612. Chas. Dunbar, Blackley, Manchester, England, to Imperial Chemical Industries, Ltd., a corporation of Great Britain.

Process carotting fur, etc., using carotting solution of a non-hydrolyzing oxidizing agent, a non-oxidizing acid, and one or more non-oxidizing mercuric salts soluble in water. No. 2,052,873. Constantine F. Fabian, Brookfield, Conn., and Alex. N. Sachanen, Luxembourg, Luxembourg, to Non-Mercuric Carrot Co., Danbury, Conn.

Silk screen process printing; stencil paper made from a transparent paper base, and coated on one side with wax, on the other with glue, and then another coat, last coat being paraffine. No. 2,052,933. Nathan Louft, Washington, D. C.

Manufacture artificial thread having high tenacity and high elongation by treating cellulose acetate thread with a liquid composition consisting of symmetrical dichloroethane. No. 2,052,974. Andre Gislou, Lyon, France, to du Pont Rayon Co., New York City.

Direct manufacture and employment of artificial fibres. No. 2,053,175. Benno Borzyskowski, Paris, France.

Processing textile yarns containing substitution derivatives of cellulose by application of a coating of a molten wax-like body. No. 2,053,270. Camille Dreyfus, New York City, and Wm. Whitehead, Cumberland, Md., to Celanese Corp. of America, a corporation of Del.

Apparatus and method for treating yarn with liquid. No. 2,053,293. Fred. Farwell Long, Chester, Pa., to Viscose Co., Marcus Hook, Pa.

Apparatus for applying liquid to yarn. No. 2,053,306. Fred. J. Williams, Bellaire, N. Y., and Harmon Howarth, Cumberland, Md., to Celanese Corp. of America, a corporation of Del.

Production artificial thread having a low lustre; by dry spinning a solution of a cellulose derivative and a salt of an alkaline earth metal, subsequently washing the latter from the thread, whereby the lustre is diminished. No. 2,053,310. Hans Altwegg and Armin Eichler, Freiburg, Germany, to du Pont Rayon Co., New York City.

Production artificial filaments, yarns, fabrics, etc., having affinity for cotton colors. Nos. 2,053,766-7. Henry Dreyfus, London, England.

Process dyeing cellulose esters; by treating material with sulfo-acetonitrile dyestuffs. No. 2,053,819. Friedrich Felix and Wilhelm Huber to Society of Chemical Industry in Basle, all of Basle, Switzerland.

Process retarding absorption of dyestuffs by the fibre; baths for treating textiles containing cellulose, which are characterized by a content of alkali, a reducing agent, and a sulfonated benzimidazole. No. 2,053,821. Chas. Graenacher, Basel, Franz Ackermann, Binningen, near Basel, Albert Landolt, Riehen, near Basel, and Wilhelm Geigy, Basel, Switzerland, to Society of Chemical Industry in Basle, Basel, Switzerland.

Manufacture artificial silk; ejecting a bundle of slightly spaced filaments of a cellulose solution into a precipitating bath containing a finely divided insoluble substance dispersed therein. No. 2,054,208. Leo Ubbelohde, Karlsruhe, Germany.

Purification bast fibres; boiling same in a solution containing sodium sulfite, then boiling them in a soap solution. No. 2,054,779. Geo. R. Bencraft to Meigs, Bassett & Slaughter, Inc., both of Philadelphia, Pa.

The Literature

Articles of interest to the chemical and process industries particularly noted in a monthly review of the U. S. and foreign periodicals. **CHEMICAL INDUSTRIES** cannot undertake to furnish reprints and those interested are referred to the journals themselves.

Coal Tar. A description of a new British coke-oven by-products plant just completed at Workington. Several photos. *The Chemical Trade Journal* (British), Sept. 4th, p187.

Dry Ice. A description of the Carba generator process. *The Dry-Ice Journal*, August, '36, p174.

Electroplating. Robert J. McKay, International Nickel, discusses the general development toward more scientific control of nickel plating baths and of the conditions which produce certain desired properties in the plate. *Metal Cleaning & Finishing*, August, '36, p461.

General. "The Chemist as a World Citizen," W. A. S. Calder. Is the address of the retiring president of the British Society of Chemical Industry. Author denies the charge that the chemists are "producers of war"; urges even greater international cooperation leading to the prevention of industrial accidents; believes chemists and engineers have a grave responsibility to point the way in accident prevention work. *The Chemical Age* (British), July 11, '36, p27.

Glass. This is the 1st detailed description of Ford's new \$3,000,000 plant for making safety glass. Dustless automatic batch handling-briquetting of batch, and other revolutionary mechanical and engineering innovations are explained. *Ceramic Industry*, September, '36, p170.

Historical. "Works As I Have Seen Them Grow," by Sir Robert Mond. This is the Messel Memorial Lecture and is really a condensed history of the development of the chemical and metallurgical industries of Great Britain as seen through the eyes of one who has played an intimate part in their growth. *The Chemical Age* (British), July 11, '36, p29.

Laboratory. "The Chemist's Job In A Modern Power Station," by G. W. Hewson. Deals principally with the chemical approach to such problems as fuel, feedwater conditioning, combustion of fuel, final flue gases and their treatment. *Chemistry & Industry* (British), Aug. 21, '36, p655.

Oils. "The Soybean—A Plant Immigrant Makes Good," by W. L. Burlison. Study of the physical and chemical properties, composition of the seed and oil, utilization of the bean, seed, and oil. *Industrial & Engineering Chemistry*, Vol. 28, No. 7, p772.

Power Alcohol. A rather critical review of the attempt of the Chemical Foundation and the Farm Chemurgic Council to aid in the solution of the farm problem through gasoline-alcohol blends is contained in the article, "Agrol Gasolines—Will They Succeed," by W. T. Ziegenhain. Some of the economics of the move are questioned as to soundness. *The Oil & Gas Journal*, Sept. 17, '36, p36.

Raw Materials. A description (with illustrations) of a modern plant just completed at an old talc mine reopened by The Southern Talc Co. at Chatsworth, Ga. *Rock Products*, September, '36, p48.

Resins. "Synthetic Resins. Their Formation, Their Elastic and Plastic Properties, and Their Possibilities," by R. Houwink. A highly technical study of the relation between the chemical and physical properties. *Chemistry & Industry* (British), Sept. 4th, p2471.

Resins. "Synthetic Resins From Petroleum," by Gordon M. Kline. Description of the types of petroleum resins as to derivation; methods of manufacture; physical properties. *Modern Plastics*, September, p34.

Rubber. "Dispersing Agents—What They Do and Their Significance for Latex and Other Industries," by J. G. Mark, W. F. Russell. Writers report use of dispersing agents in industry is practically a virgin field and suggest laboratory experimentation to determine whether or not a given product can be improved by their use. *India Rubber World*, September, '36, p50.

Safety. C. H. S. Tupholme discusses the work of a British committee in the formulation of rules to prevent kier accidents. *American Dyestuff Reporter*, Sept. 7th, '36, p483.

Urea. "Urea and Rubber," by J. F. T. Berliner, du Pont, discusses early uses of urea in rubber compounding, urea as a preservative for latex, as a vulcanization accelerator, applications in sponge rubber, miscellaneous uses. Physical properties are listed. *The Rubber Age*, Vol. 39, 6, p329.

Waxes. The S. C. Johnson & Son, Inc., Racine, is a large user of Carnauba and recently the company financed an expedition to the Brazilian jungle to study sources of supply. By J. Vernon Steinel. *Industrial & Engineering Chemistry*, September, '36, p. 1004.

Miscellaneous Booklets

"Germany's Nonferrous Mineral Industries—Present Situation and Future Possibilities," by Charles Will Wright, Special Supplement No. 3, Mineral Trade Notes, U. S. Bureau of Mines, Dept. of Interior.

"Analyses of Commercial Fertilizers," Bulletin 307, South Carolina Agricultural Experiment Station, Clemson, S. C.

"Spray Residues and Their Removal from Apples," by Walter S. Hough, Bulletin 302, Virginia Agricultural Experiment Station, Blacksburg, Va.

"Colloid Chemistry of Cellulosic Materials," by Alfred J. Stamm, 90p., 10c., Supt. of Documents, Washington.

Disposal Methods for Effluent Gases

By W. A. Damon and B. Wylam*

FUME and gas emission prevention methods may be divided into 2 categories. First, those which aim at retention of gases within the system by the efficient design, maintenance, and operation of the plant where such gases form an integral part of the reagents employed in the particular manufacturing process; secondly, processes which aim at the absorption or destruction by chemical or other means of gases evolved by a process where the gases are unavoidably produced as an unwanted part of the process or as a byproduct.

Reference to the table of toxicity will show that some gases are highly toxic, even in a very diluted state, and can cause great annoyance at long distances.

Parts Per Million Parts of Air

Gas or Vapor	Symptoms after several hours	Maximum amount which may be inhaled for 1 hour	Dangerous in 30-60 minutes	Rapidly fatal
COCl ₂	1.0	3.0	25	Over 25
HF	3.0	10.0	50-250	—
AsH ₃	30	—	50	250
Nitrous fumes ..	39	—	117-154	240-775
Cl ₂	1.0	4.0	—	1,000
H ₂ S	100-150	200-300	500-700	1,000-3,000
HCN	20-40	50-60	120-150	3,000
CO	100	400-500	1,500-2,000	4,000
PCl ₃	0.7	2-4	50-90	6,500
SO ₂	10	50-100	400-500	—
HCl	10	50	1,000-2,000	—
NH ₃	100	300-500	2,500-4,500	5,000-10,000
CS ₂	320-380	480-800	1,150	—
C ₆ H ₆	1,570-3,130	3,130-4,700	—	19,000
CHCl ₃	200	5,000-6,000	14,000	25,000
CCl ₄	1,600	4,000-6,000	24,000-48,000	48,000-63,000
C ₆ H ₅ NO ₂	0.2-0.4	1.0	—	—
C ₆ H ₅ NH ₂	7.0-26.0	105-161	—	—
CH ₃ C ₆ H ₄ NH ₂ ..	6.0-23.0	91-140	—	—

Hydrochloric from salt and sulfuric has now largely been superseded by its synthesis by burning chlorine in an atmosphere of hydrogen. In either case, resultant gases must be cooled, and the acid absorbed by water. This may be carried out in large stoneware towers, packed with coke, but in the synthetic process and where a muffle saltcake furnace is employed, it is more usual to make use of a series of saddleback jars or of a silica pipe absorber. If a solution of more than 20% hydrochloric be desired, it is essential not only to cool the gases adequately before absorption, but also to provide for dissipation of the heat of solution.

The sulfuric acid process is typically one from which an excessive escape is almost invariably due either to accident or inadequate supervision. British regulations provide that the total acidity per cu. ft. of the residual acid gases of sulfur and of nitrogen, escaping must not exceed the equivalent of 4 grains of sulfuric anhydride. There is no real difficulty in conforming, provided the plant is not pressed beyond its proper capacity, and is under efficient control. Average escape is much below being usually 1 to 1.5 grains. Frequently it is the escape of nitrogen oxides from a chamber plant rather than the sulfur dioxide which embarrasses the manufacturer, owing to the attention attracted by their red color. To avoid such emission, ample Gay Lussac tower space should be allowed, and the

temperature of the acid feed thereto should not exceed 80° F.

Using a good packing, a tower volume of at least 25 cu. ft. per 100 lb. of sulfur burned per day should be allowed. This allowance should be increased if the plant is to be operated intensively. Some

plants, for instance, use as much as 40 to 50 cu. ft. of Gay Lussac space per 100 lb. of sulfur burned per day.

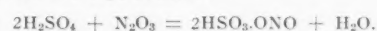
A very interesting development was the subject of a recent paper, by Price and Dooley, in which the construction and operation of a water wash tower placed between 2 of the Gay Lussac towers of a Mills-Packard sulfuric acid plant was described. Water scrubbing at this point of the system effects economy in niter consumption, and reduces acidity of the escape to very low limits.

In superphosphates gas is evolved both from the mixer and from the den. This is mainly carbon dioxide, but it also contains varying proportions of hydrochloric, hydrofluoric, silicon tetrafluoride, and sulfur dioxide. It is advisable, in order to allow time for the silicon tetrafluoride to react with the water vapor of the gases (producing hydrofluosilicic acid and silica), to provide a long flue of ample dimensions to carry gases from the den and mixer to the absorbing tower. This flue, moreover, should be readily accessible, to allow for the removal of the silica deposited in it.

An alternative to the long flue is a delay chamber containing baffle boards, through which the gases must pursue a tortuous path. Acidic constituents must then be removed before discharge to atmosphere. For this purpose a series of void towers is used, constructed of 3-in. planks, and fitted with high-pressure water sprays. Dimensions and number of the towers depend on the size of the plant, but a total space of 1,000 cu. ft. per 10 tons of superphosphate per hour will not be excessive. It is advisable to follow the washing towers with a tower, packed with wooden lathes on edge, to act as a spray eliminator, and the whole plant should be under suction of 1/10-in. to 1/5-in. water gauge, provided by a fan which should always be placed in the terminal position. Provided the silicon tetrafluoride has been decomposed, there is no difficulty in reducing the acidic content of the gases to below the equivalent of 0.1 grain of sulfuric anhydride per cu. ft., which will represent a scrubbing efficiency of over 98%.

Efficient absorption of nitrogen oxides is difficult, because nitric oxide must be oxidized to nitrogen peroxide—a slow reaction when the nitric oxide is in dilute concentration. Oxidized gases may be absorbed in (a) water, (b) sulfuric, (c) concentrated copperas.

(a) Absorption in water has been fully reviewed by Webb ("Trans. Inst. Chem. Eng.," 1929, 7, 34), who emphasizes importance of providing space between the absorbing towers for the oxidation of nitric oxide. Maximum strength of acid attainable is 68%. (b) Sulfuric of 75% strength reacts with nitrogen trioxide to form nitrosyl sulfuric.



It also reacts with nitrogen peroxide to form nitrosyl sulfuric and nitric.



Nitrous vitriol thus produced can be utilized in the Glover tower of a sulfuric acid plant, and this method, therefore, is to be recommended at works where sulfuric is also produced.

(c) Absorption in copperas solution is easy and, if there is a market for ferric sulfate, this provides a good method which has been employed with success.

Nitrogen oxides are extremely dangerous in concentrations of the order of 100 or more parts per million. Inhalation of dilute concentrations causes no immediate symptoms; the gassed

Digested from paper delivered to Section F4, recent International Chemical Engineering Conference held in London. Authors are chief alkali inspectors for England and Wales and for Scotland respectively.

person often feels quite well for several hours. Symptoms of acute pneumonia are then apt to develop, and in severe cases death supervenes.

Few condensing systems are efficient to render tail gases from distillation of tar and tar products inoffensive. Unless the material undergoing distillation has previously been washed, there is hydrogen sulfide in the tail gases, as well as uncondensed hydrocarbons. In the distillation of tar itself, gases which remain after condensation may be passed through a box containing either oxide of iron or slaked lime. Another method, permissible only if the volume is relatively small, is to pass the gases *via* a safety seal pot into the still furnace. In the distillation of tar products (naphtha, light oil, tar acids, etc.), similar methods may be used.

When oils such as benzol, toluol, etc., have been washed with alkali, prior to rectification, there is little fear of noxious constituents in the tail gases save uncondensed hydrocarbons, and with an adequate condenser the concentration of these should be very low. It is, however, desirable that the condenser end should be vented through the roof, into a small tower packed with rings and irrigated with gas oil.

Contamination of gaseous effluent by hydrogen sulfide is very common and small quantities are readily detected by smell, but dangerous concentrations are odorless, as they cause immediate paralysis of the olfactory nerve. Following table ("U. S. Bureau of Mines Bull.," 551, '33) illustrates the toxicity:

	Parts per million parts of air
Minimum perceptible odor	0.13
Weak odor readily perceptible	0.77
Easily noticeable odor	4.60
Strong, forceful odor	27.00
Slight symptoms of gas-eyes after one hour.....	50-100
Marked symptoms of gas-eyes after one hour.....	200-300
Dangerous in half an hour.....	500-700
Rapid unconsciousness	700-1,000
Death in a few minutes.....	1,000-2,000

In the distillation of gasworks ammoniacal liquor, gas evolved contains hydrogen sulfide, carbon dioxide, hydrocyanic acid, pyridine, hydrocarbons, and steam. After cooling to atmospheric temperature, the foul gases may contain from 10-20% by volume of hydrogen sulfide, and the total volume of foul gas will amount to from 2 to 3 cu. ft. per gal. of gas liquor. Various treatments are: (a) By combustion, with subsequent absorption of the sulfur dioxide produced, or its utilization for sulfuric, sulfites or bisulfites. (b) By absorption of the hydrogen sulfide in hydrated oxide of iron, with production of spent oxide. (c) By treatment in a Claus kiln with recovery of elemental sulfur.

At a sulfuric-acid works 1st method would be the most convenient, but not without its disadvantages, in that a volume of inert gas is admitted to the chambers, occupying valuable chamber space. Care must be taken to eliminate all ammonia from the gases, for it is extremely detrimental to the economic operation of a chamber sulfuric-acid plant. Gas should be conducted to the burner fronts and there split into a number of small streams, each of which is conducted into the burner top where there is a sufficient oxygen supply and temperature to ensure the oxidation of the hydrogen sulfide to SO₂.

Absorption of hydrogen sulfide by passage through hydrated oxide of iron is favored where no sulfuric plant exists. This method is especially suitable in gasworks where the oxide can be readily worked up to a sulfur content of about 30% and then transferred to the coal gas purifying system, where the sulfur content can be increased to 45-50% before sale. Oxide purifiers should always be placed on a concrete base, for experience has shown that the gas can find a way through ordinary made ground, and make its presence felt at a surprising distance from the purifying apparatus.

In the Claus kiln, hydrogen sulfide is converted to sulfur by a bauxite catalyst. At dye factories, where gases are evolved

in production of sulfur colors, it is now customary to draught the tail gases to a central absorbing plant where sodium sulfide for use in the process is made.

A method of indicating the presence and approximate concentration of hydrogen sulfide evolved by Imperial Chemical Industries, involves bubbling air, from strategic points on the plant, at a constant rate through an indicator solution of alkaline sodium nitroprusside. Range of concentration of hydrogen sulfide, through which the indicator works, may be varied from 2 parts per million upwards.

Where an outlet for sulfites and bisulfites exists, problem of the absorption of the sulfur dioxide in smelter gases presents no great difficulty. The gas is converted, in a contact plant, into sulfuric, and 95% of the sulfur recovered.

Possibility has been examined of absorbing the SO₂ in a suitable solvent and then releasing it in concentrated form while regenerating the solvent solution for further use. Sulfur dioxide thus prepared may be used for various industrial purposes, or may be reduced to elemental sulfur by passage through incandescent coke.

Chlorine must be so regulated that none escapes. In the manufacture of alkali hypochlorite solutions, lime in not less excess than 5% should be used, depth of absorbing liquor should be at least 6 ft., a mechanical stirrer should be provided, and the absorbing liquor maintained at a temperature not below 70° F. Under these conditions, there is little possibility of chlorine escaping from the vat. The pipefeeding chlorine into the vat is, however, prone to corrosion, and should be examined frequently and renewed before corrosion becomes severe.

Processes employing chlorine for bleaching powder should be provided with a final tower fed with soda, or milk of lime, to ensure that no chlorine escapes. Chlorine has a great affinity for certain metals such as tin and antimony, and to a less extent iron; a vessel packed with pieces of tin or antimony makes an excellent "catch" for residual chlorine.

Symposium — New Metals and Alloys for Chemical Industry

Digest of Papers Delivered Before the Recent Meeting of the American Chemical Society Held in Pittsburgh, Pa. The First Discusses Fundamentals Governing the Practical Evolution of New Metals by B. D. Saklatwalla

Immediate future of metallurgical progress in the chemical industry lies in the development of metals which will withstand high temperatures, together with abrasion and chemical attack. Besides the direct use of such metals in actual chemical plant equipment, they will have a great future in the adjunct industries, such as in power generation. For fire boxes, boiler tubes, and also for tubes for metal recuperators and heat exchangers, such new metals will have an unlimited field. They will undoubtedly change the aspect of the chemical industry from the standpoint of production cost. Just as the development of high temperature resisting materials is important, so is it the case with low temperatures.

It is important that metals should be developed which would perform functions at extreme low temperatures. Processes have been developed for removing wax from paraffine products by refrigeration and similar other chemical operations of fractional crystallization can be carried out and certain separations achieved at extreme low temperatures which are not permissible at present. This would open up a new and vast low temperature chemical technique.

With the advent of high-tensile steels and other high-tensile metals and alloys, factor of resistance to atmosphere corrosion has become vastly important. In designing equipment it is only

possible to take advantage of high yield-strength material if it is permissible to curtail weight of the structure by the use of very much thinner sections. In the case of very high-strength material, if full advantage of the strength is taken, such sections may become so thin that any corrosion on the surface of the section would affect quite a large percentage of the total volume of metal involved and would therefore cause failure. For such high-strength material, therefore, it becomes necessary that it be resistant to atmospheric corrosion.

In the field of steel metallurgy, the most recent important advancement can be said to be the commercial production and application of the so-called low-alloy high-tensile corrosion-resistant steels. These steels, for the same carbon content, have practically twice the yield-strength of ordinary carbon steel. When high yield-strength is obtained by increasing the carbon content, a proportionate rise in the tensile strength takes place.

In the case of these modern low-alloy high-tensile steels, yield strength is obtained by the balanced presence of various alloying elements which increase the yield strength without correspondingly increasing the tensile strength. These steels, therefore, have a very much higher ratio of yield to tensile strength compared to the older steels.

The effect of this high ratio is to produce steels of a very high degree of ductility in combination with the high yield-strength. Further, the alloys can be so selected as to obtain high fatigue and impact values. As the amount of alloying elements in these steels is low, they do not show any objectionable air hardening propensity, as steels containing large percentages of alloying elements do.

On account of this, such steels can be subjected to hot forming or welding operations without manifestation of objectionable hardening or brittleness. The most important desideratum in these steels is, however, the ability to resist corrosion from atmospheric elements and other mild corroding media usually encountered by engineering structures.

The elements that have been used up to now for the production of high-tensile corrosion-resistant steels are mainly copper, chromium, nickel, silicon and phosphorus. Such steels on the market today all contain copper and can be conveniently divided into 2 main groups, a chromium-copper group and a nickel-copper group.

Importance of Stainless Steels

Among ferrous metals of importance to the chemical industry are the so-called stainless steels. While they have been in use for considerable length of time, they have really made the big strides within the past couple of years. This is apparent from the fact that in the year 1935 approximately \$55,000,000.00 worth of stainless steel was consumed in the U. S.

While the major composition of stainless steel has remained the same, and while it has been definitely established that different chromium percentages from 12 up to 25 produce certain definite qualifications for particular uses in the chemical industry and also that the 18% chromium 8% nickel composition has found a general adoption for all purposes where stainless steel is used, nevertheless it has been recognized rather only recently that the presence of other elements very favorably alters the properties of such steels.

For instance, silicon and aluminum have become more or less essential when the steel is exposed to high temperatures. Tungsten also has been added for the purpose. Copper, alone or with silicon, is used to modify some properties of high chromium or high chromium-nickel steels.

Addition of 2% to 4% molybdenum has made stainless steel of the 18-8 type practically indispensable in the sulfite pulp and very useful in the phosphoric acid industries. It may, therefore, be said that the development of stainless steels suitable for resistance to chemical and temperature attack has taken place rather recently.

Of the important advancements that have been made in stainless steel of the 18-8 type in recent years, the following deserve

special notice. The addition of nitrogen has brought about very remarkable grain refinement. The use of titanium or columbium has solved a very baffling problem which confronted the use of stainless steels when they were subjected to a high temperature of between 500° and 800° C.

Among the non-ferrous metals, there are 2 which stand out very prominently for the advance they have made in the chemical industry. The growth of employment of both nickel and aluminum has been phenomenal.

It seems a remarkable fact that, in the non-ferrous metals, resistance to chemical corrosion is brought about by 2 diametrically opposite procedures. It is found that, when metals are purified to a super-pure state, they seem to withstand corrosion to a tremendously higher degree than if they were just in the commercially pure state. For instance, zinc, aluminum and lead, in percentages above 99.99 show characteristics of corrosion resistance which are not met with when the metallic content is only a few hundredths of a per cent. less. On the other hand, when a very infinitesimally small amount—in the magnitude of approximately .05% —of an impurity is added to a pure metal, a great degree of corrosion resistance is acquired. As an example may be cited the addition of .05% tellurium to lead.

While the science of metals has progressed remarkably and the art of alloying various elements into metals has also reached a high degree of accomplishment, yet it seems that the ultimate goal is distant. In cases where a certain set of physical properties is required in the body of the metal, together with certain surface properties which the body does not possess, recourse is still had to composite materials.

A new field of metallurgy is known as "powder metallurgy." Powders of various pure metals are produced and mixed in the proportions desired, pressed into a rod or briquette, which is sintered and the sintered product then rolled or forged. This art may prove of considerable advantage to the chemical industry inasmuch as it permits the mixing of metals, independent of their inherent alloying solubility in each other. By this technique it is also possible to obtain a composition of the surface entirely different from the body of the sintered metal.

The tendency seems towards producing containers which are composite in their structure. It may be possible that with the perfection of corrosion-resistant high-strength metals, containers can be made which will resist the corrosive action of the contents, will have the ability not to contaminate the products shipped in them, and also be extremely light in weight.

Chromium and Alloys in the Chemical Industry

By W. J. Priestley

Because of its inherent characteristic to resist corrosion and oxidation, and its ability to impart these properties, as well as hardness and strength to steel, even at elevated temperatures, chromium has played a most important part in the development of better equipment for the chemical industry. Today we have many different commercial grades of so called "corrosion resisting" and "rustless" or "stainless steels" containing from 1% to 35% chromium. A list of the elements that are used for modifying the properties of straight chromium steels include nickel, silicon, manganese, molybdenum, copper, tungsten, columbium, titanium, nitrogen, aluminum, sulfur, selenium, zirconium and vanadium.

Steels containing up to 3.50% chromium are known as "mild alloy steels" and their use was developed to replace simple carbon steels because of their greater strength and resistance to atmospheric corrosion. Among steels containing 3.50 to 9.00% chromium are the well known 4 to 6% chromium steels which were originally developed as a compromise in quality and cost between the higher chromium stainless steels and plain

carbon steel. They are finding general use in the petroleum refining industry where good service is obtained in oil still tubes.

With carbon under 0.12% and chromium raised to 16 to 20% we have a steel which possesses excellent corrosion and oxidation resistance without special heat treatment. Addition of 1 or 2% of nickel hardens and raises the strength of this steel when heat treated, making it suitable for aircraft construction.

When chromium is increased to over 20% we have an alloy that offers good resistance to oxidation up to 2000° F. Nitrogen is sometimes added to this grade of steel to retard grain growth when it is held for a long time at high temperatures. For ordinary use, nitrogen will reduce the grain size and make the metal more shock resisting.

A new alloy has been developed which contains 35% chromium and 7% aluminum which is good for continuous service at 2300° F.

The group of 17 to 20% chromium and 7 to 10% nickel steels represents the best known and most widely used stainless and corrosion resistant steels. Their popularity is due to their ease of fabrication and good physical properties at high and low temperatures, combined with their excellent resistance to oxidation at high temperatures and many different kinds of corroding media.

They cannot be hardened by heat treatment, but by cold working their ultimate strength can be raised to over 200,000 lbs. per square inch with suitable ductility, which makes them satisfactory for light weight structures requiring great strength.

Alloys containing from 13 to 20% chromium and 60 to 80% nickel are used in the food and dairy industries. They have good resistance to oxidation up to 2000° F. and are also used for electrical resistor material for high temperature service. It has been demonstrated that the addition of chromium to nickel makes it free from tarnishing and corrosion under the very conditions for which nickel itself is unsuited.

Laboratory tests are not sufficient to qualify a particular type of stainless steel for commercial application. Performance of a given metal should be tried out under circumstances as nearly similar as possible to practical operating conditions. Small pilot operating units are frequently built to try out new metals, thus saving time, expense and trouble that might arise if experimentation were done in a full size operating unit.

Nickel

By R. J. McKay

Weight of nickel is intermediate between the light and very heavy metals. Its melting and annealing range are so high as to require the best refractory furnaces for handling and to make such processes as extrusion and die casting difficult. Its strength and hardness run higher than mild steel and its ductility makes it respond readily to most shaping and cutting operations. Air, soil, natural waters, salts and brines, organic materials and foods, and alkalis are well resisted by nickel.

Outstanding attribute of chromium in corrosion resistance is its ability to form passive films in most oxidizing agents and it imparts this ability to many of its alloys. Outstanding attribute of copper is its complete resistance to strong acids unless some oxidizer is present. Nickel is resistant to acids and will develop oxidation passivity, but does not reach the complete resistance to oxidation or to acids of chromium on the one hand and copper on the other. Chromium and copper are not mutually soluble but both are soluble in nickel. Thus, we have 2 major series of nickel alloys resistant to corrosion, each leaning in corrosion resistance toward one of the 2 major chemical corrosives, acids and oxidizers.

It is now possible to plate nickel on a variety of base materials, which must be properly prepared, electroplate being perfectly adherent and sounder than furnace metal, with a range of physical properties wider than rolled metal, and to make the

plate as thick as is desired. Such electroplates are not now being commercially made in this country, but are being made in England. Cost of making them is no greater than for the ordinary decorative plate plus the cost of the added nickel.

Silver and Precious Metals

By James A. Lee

More silver equipment in use in the process industries than is realized. Metal possesses certain physical and chemical properties that are superior to those of any other, but until recent years the price had prohibited its adoption except in some few special cases. Pure silver is most often employed for equipment, although sterling and coin silver, containing 7.5 and 10% copper, respectively, are occasionally used. Alloys are less resistant to corrosion than fine silver (999 fine); however, their strength is considerably greater, and they are generally amenable to the same treatment as the pure metal.

The malleability and ductility of silver are exceeded only by gold. It is sometimes necessary to harden the metal by the addition of copper. But as copper lowers the corrosion resistance for most chemical purposes the soft, pure metal is preferable. Entire mass of a piece of silver is subject to rapid changes of temperature under the action of external thermal influences. Its electrical conductivity is also higher than that of any other metal.

Gold, platinum, palladium and other metals of the platinum group, and also tantalum are used for construction of equipment but, of course, in contrast to the lower cost materials, they are to be found in relatively small quantities and only in vital spots and for extreme conditions. They have an immensely important role, however, for in places where they are employed no other material can be substituted and upon their successful performance generally depends the success or failure of the operation of equipment or process.

Physical and chemical properties of gold make it very attractive for certain applications in equipment for the manufacture of several chemicals where high purity is desired. Although it is not generally known, important quantities of the yellow metal are being used at present. Gold has a fairly high melting point, 1940° F., and does not oxidize even at high temperatures.

Gold is completely resistant to all mineral acids, but of course is readily soluble in aqua regia. As the pure metal is very soft, it is usually alloyed with a certain proportion of other metals; platinum is often preferred as the additional metal since the resulting alloys have an increased resistance to chemical corrosion.

In general platinum and the members of the platinum group are remarkably inert to chemicals. It is quite feasible to make large pieces of equipment out of platinum; though the initial cost is of course high, scrap value is also high. Practically any shape can be fabricated and repairs can be easily made. The largest quantities of the platinum metals that are used in the chemical industries are employed in the form of catalysts.

Among the most interesting of the recent developments are previous clad metals and plated surfaces. These applications of the most expensive metals will no doubt be further utilized by the process industries in the future. Advances have been made in the technic of plating platinum, rhodium and palladium. Gold, silver, platinum and other precious metals can be clad on nickel, brass, copper and steel bases. Layers of the precious and base metal are welded together and rolled or drawn to finished dimensions. The surface is corrosion resistant even with veneers as thin as 0.001 inches, although the usual ratio of precious to base metal is 1 to 10. Development of a method for covering a base metal with a highly corrosion resistant material makes the precious metals available for large equipment where extreme resistance to corrosion is required, and at a relatively moderate cost.

Camphor as a Catalyst for Sulfuryl Chloride

A new sulfuryl chloride process, developed by chemists of the National University of Peking, is based on the reaction of sulfur dioxide and chlorine with pure camphor as the catalysts. Five hundred grams of the camphor are introduced into a flask cooled in ice. A current of sulfur dioxide is passed through the apparatus for an hour, then a current of chlorine is passed for the same period. Two gases, in the same order, are then circulated for half an hour each; then a mixture of equal volumes is passed through until no further absorption takes place. Reaction takes about 24 hours, after which the contents of the flask are distilled on the water bath. Fraction which boils over between 68° and 70° is collected separately. K. Tanaka, *Chimie et Industrie*, September, '36.

Addition of Bone Meal to Superphosphate

Superphosphate properties are improved by the admixture of 5 to 10% of its weight of bone meal. Mixture is less hygroscopic and free acid is practically eliminated. P. A. Baronov, *J. Krim Prom.*, 12, 9, p932.

Production of the High Molecular Glycols

High molecular glycols are produced by treating persulfates with saturated fatty acids containing at least 8 carbon atoms in the molecule suspended in sulfuric or oleum, if desired in the presence of boric acid. In an example, stearic acid is treated with potassium persulfate in the presence of monohydrate, boric acid and silver sulfate, and resulting wax saponified. Heptadecene glycol is thus obtained, saponifiable portion of the wax consisting of oxidized acids and unchanged stearin acids. Natural mixtures of fatty acids may also be employed. English Patent 449,221 to German firm, Bohme Fettchemie-Ges., Chemnitz.

Formic by Direct Catalytic Production

Direct catalytic production of formic acid (English Patent, 447,492, '34, I. C. I.) is obtained by reacting carbon monoxide and water at a pressure of 2,000—3,000 atmospheres and 175—250° C. An excess of carbon monoxide is preferred, and catalysts such as hydrogen or metal halides, metal oxides, or non-volatile acidic oxides may be present in small amounts. In examples, a pressure vessel containing one-sixth of its volume of water is filled with carbon monoxide. Pressures and temperatures specified are 3,000 or 2,000 atm. and 200° or 175° C. Phosphotungstic acid equal to 10% by weight of the water may be present. After one or several hours, the vessel is cooled and the pressure released. E.P. 406,344 and 406,345, and U.S.P. 1,895,238 are referred to.

Carbon Black from the Monoxide

"Carbonalpa," a carbon black is prepared from monoxide. Workable catalysts have been found for obtaining satisfactory results from $-2\text{CO}=\text{C}+\text{CO}_2+39,000$ cal. At the most suitable working pressures, temperature is the deciding factor in the equilibrium, the gas being transformed into carbon and carbon dioxide at low temperatures, while at high temperatures the carbon dioxide is reduced by the carbon. In the process developed the carbon dioxide produced is reconverted into carbon monoxide, and the quantity of fuel consumed reduced to the equivalent of the quantity of carbon black manufactured, together with a certain additional quantity to cover the inevitable losses. As compared with the usual types of carbon black, the new material has a high content of ash (6.56%). It is impossible to reduce this ash, owing to the difficulty of removing the residues of the catalyst. *L' Industrie Chimique Belge*, August, '36.

Italian Oleum Plant Described

New oleum plant of the Italian company, S.A. Industrie Chimiche has several innovations in operating methods. The sulfur dioxide is obtained by burning fused sulfur in a completely closed furnace. Air for combustion is previously dried by passage through a tower containing concentrated sulfuric,

the dioxide obtained being practically anhydrous. Sulfur fusing plant is so constructed that all the mechanical impurities in the crude sulfur are removed, and the only purification which the burner gases undergo is fine filtration to remove the small particles of impurities which escape separation in the sulfur fusion plant. A detailed description of the operation of the plant is given, together with efficiencies. *La Chimica e L'Industria*, August, '36.

Gasoline Discussed at World Power Conference

A newly-perfected method for producing high quality gasoline from any fuel was described to industrialists and scientists who attended the recent World Power Conference, in Washington.

Gasoline, under this synthetic process, is made by changing coal, lignite or even peat into water gas by customary methods. The water gas is then synthesized into gasoline at high temperatures and pressures by use of a catalyst.

Among the solid fuels from which gasoline has been developed in this manner are bituminous coal, coke, brown coal, brown coal briquettes, peat and wood. Gases required for the synthesis can also be produced from natural gas and coke oven gas.

Authors of the report, Drs. H. Koppenberg and Schattman, stated that although synthetic manufacture of motor fuels by the Fischer-Tropsch process has been developed during a period of 10 years, only recently has the method been placed in commercial operation on a large scale. In addition, the German scientists described 2 other methods for turning coal into gasoline.

One involves heating the coal to 500° C. which splits it into about equal portions. First part bears a resemblance to motor fuel and is rich in hydrogen. It contains about 8% gasoline. Other part is coke or semi-coke. This method, which they contend is new, is of value only when a ready market can be found for other products of the process.

Third method calling for low temperature carbonization of lignite has proved commercially advisable only when its by-products can be used at the source of their production.

Reaction for Bromine Oxide

Bromine oxide (Br_2O) can be produced by the action of bromine on mercuric oxide in solution in carbon tetrachloride. Oxide is unstable, decomposing rapidly under the influence of light. No details of the method are given. *British, Chemical Trade Journal*, Aug. 21, '36, p152.

Concentration of Ammonium Chloride

Concentration and crystallization of ammonium chloride solutions is recommended in pitch-pine vats which are lined with acid resistant stone and heated by indirect steam in a cast-iron coil. Heating is continued until the lye is saturated at 100° C. After a short period of settling, it is filtered through linen cloth and bone charcoal into another vat, where it is allowed to crystallize during the 7 days on suspended wooden rods. Iron-free sal ammoniac can only be obtained by treating the boiling solution with a little chlorine and precipitating the iron with ammonia before filtering. *Chemiker Zeitung*, June 24, '36.

Metallic Compounds of Phthalic Anhydride

Metallic compounds of phthalic anhydride have been developed which have distinct possibilities in pigments. Tables are presented to show that these compounds, even in white, are practically opaque to ultra-violet light at all wave lengths. Titanium and lead phthalates are referred to in detail. Possibilities of various metallic phthalates are suggested for improving rubber and its derivatives, for increasing the light resistance of viscose films to be used in packaging, for the opaquing and strengthening of various cellulosic products, and for decreasing the chalking tendencies and increasing the tint retention of paints or lacquers. General methods of production and some physical properties of the pigments are indicated. Henry A. Gardner, *Industrial & Engineering Chemistry*, September, '36, p1020.

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Bulk Packaging, Handling, Shipping

M.C.A. Container Committees Meet

Various container committees of the Manufacturers Chemists' Association met during the 3rd week of last month at the Chalfonte-Haddon Hall in Atlantic City. Gathering was more an informal get-together preliminary to the more formal hearings which are scheduled for later in the fall. Several representatives of the Bureau of Explosives attended the conferences. Discussion of the use of inert alloys for the transportation of corrosive chemicals was one subject which occupied a great deal of attention from the country's leading chemical packaging experts attending the meeting.

Bulk Packaging Symposiums Assured

Bulk containers will receive suitable attention at the next Packaging Exposition. At a luncheon meeting held last month in N. Y. City, attended by leading bulk packaging experts, it was decided to hold 2 round table discussions, one on bags and the other on drums. R. W. Lahey, Cyanamid, is arranging the symposium on drums and the program on bags is in the hands of Williams Haynes, publisher of CHEMICAL INDUSTRIES.

Light-Weight Hand Truck

A hand trucking device consisting essentially of a detachable lift-jack and a platform unit, which together are designated as Clark lift-jack and platform equipment, has been announced by the All Steel Welded Truck Corp., Rockford, Ill. Jack-unit, weighing not more than 42 lbs., consists of a reinforced steel

housing enclosing a fulcrum lift mechanism designed to produce a lifting power of 6000 lbs. with only 76-lb. handle pressure.

Phenolic Resin Covered Barrel Staves

A barrel stave which is waterproof and also proof against attack by most chemicals is made of wood, preformed in a number of thin plies in the stave shape (that is, with both lateral and longitudinal curvature), and bonded together in an integral stave by means of a phenolic resin, has been patented by Thomas D. Perry, New Albany Veneering Co., New Albany, Ind. U. S. Patent 2,050,461.

Articles of Interest to Plant Superintendents

"Modern Weighing Equipment" is the title of an article in *India Rubber World* by Philip B. Richardson and deals principally with the methods of solving the various weighing problems met with in the rubber and allied industries. A large part of the article is given over to procedure for weighing chemicals. While primarily reporting on devices manufactured by Richardson Scale Co., Clifton, N. J., the article is fairly broad in its applications and viewpoint.

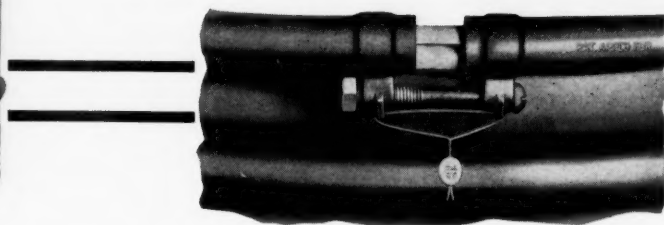
Another article of interest to those charged with handling problems noted last month was "Lower The Overhead With Proper Handling Equipment in the Shipping Department," by Earl K. Collins, *Shipping Management*, August, '36, p9. Power-driven handling trucks are discussed.

Conveying Truck with Laminated Phenolic Sides

A new truck for conveying storing and processing products where steam or chemical conditioning are involved has been designed by the Continental-Diamond Fibre Co., East Newark, Del. Sides and ends of this truck are of "Dilecto" laminated phenolic material which is highly resistant to moisture, moderate concentrations of such acids as sulfuric and hydrochloric, and ordinary solvents as alcohol, benzene and turpentine.



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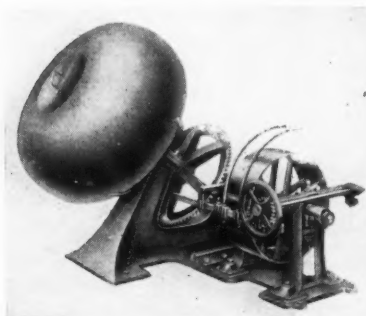
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New Equipment

For Intimate Mixing

QC 386

There is a new type of mixer, built in eight sizes, on the market. These new mixers have bowls ranging in diameter from 18" to 72", with capacities from 1 to 75 cu. ft. Bowls



on these mixers revolve, having within them balls of large diameter which roll around the inside periphery of the bowls as they revolve.

These machines are used for a more intimate type of mixing than can be obtained with mixers of the ordinary type, as the materials being mixed are ground intimately together by the rolling action of the balls. These mixers are used for blending and mixing dyestuffs, colors and chemicals, and are used without balls for the coating of chewing gum, candy and pills, and for other processes and pharmaceutical work.

The manufacturer builds these machines with bowls and balls made of cast iron, steel, stainless steel, aluminum, Monel Metal, copper and other materials. These mixers are offered in both belt and motor-driven types.

Low Range Recording Instruments

QC 387

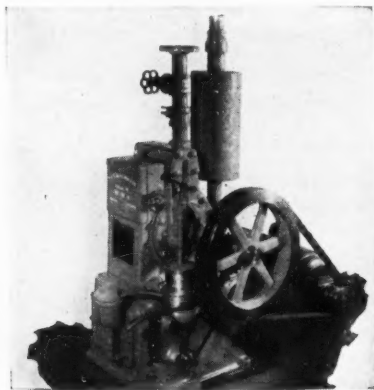
A large manufacturer of recording instruments announces a new series of low-range recording gauges and controllers, known as the Model D40M series. These instruments are equipped with enclosed bell-type measuring elements and are offered for draft or pressure in minimum ranges of 0 to 0.2 inches of water and maximum ranges of 0 to 2.0 inches of water. Because of the large operating area of the liquid-sealed bell, the measuring element is exceedingly accurate and has the power to respond instantaneously to scarcely perceptible pressure changes.

Maintaining High Vacuum

QC 388

A recent development of one of the large equipment manufacturers is the attachment of either a continuous oil clarifier or a solvent vaporizer to its high vacuum pumps. These attachments, by preventing re-evaporation, enable the pump to produce and continuously maintain a high vacuum under difficult service conditions where up to now the continuous maintenance of such high vacuum has been impossible. Continuous oil clarifier removes any condensed moisture and foreign matter so that high efficiency and high vacuum are constantly maintained. It makes possible the use of the same oil for months without change.

For use with certain solvents which mix with oil, the pumps may be equipped with a vaporizer which continuously evaporates the solvent from the oil and returns the purified oil to the oil reservoir. Dilution of oil and loss of vacuum are prevented.

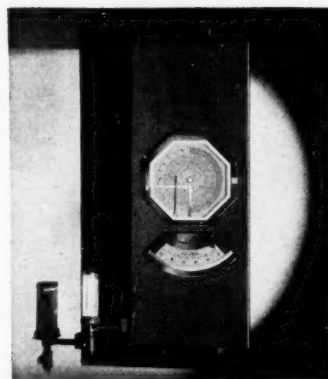


Before being re-used the sealing oil passes through an electrically-heated chamber which is thermostatically controlled to assure proper temperature for solvent removal and to prevent carbonization of the oil. When the vaporizer is used no clarifier is necessary.

CO₂ Measurement

QC 389

Latest developments in the measurement of CO₂ are incorporated in a new design of



CO₂ meter. Experience gained in hundreds of plants over a period of many years has been utilized in building this improved analyzer. Per cent. CO₂ in the flue gas is measured by the Orsat method, which is the accepted standard for industrial practice, and the meter is built to duplicate, mechanically, this chemical analysis.

Other New Equipment of the Month

Other new equipment announced within the past month or 2 includes: a complete new line of pocket size voltmeters, ammeters, and milliammeters incorporating a new type of element with higher torque and improved characteristics, and with an accuracy of 1% of full scale value (QC390); a new line of controllers for temperature, time-temperature, flow, liquid level, pressure, time-pressure, and humidity offered primarily for applications where a greatly reduced sensitivity (wide throttling range) is required and the load conditions fluctuate over a wide range (QC391). The same well-known instrument maker is offering round chart recording voltmeters and ammeters to fill the requirements of industrial plants, especially for process work where voltage and current affect the quality and cost of manufacture of the product (QC392).

A new low-cost emulsifier (\$120) is motor driven and has a capacity from 10 to 15 gals. per hr. depending upon the emulsion (QC393); latex tubing for laboratory and general use made without fillers, colors or extraneous matter other than curing agents, ageing resistance is said to be 300% greater than acid cured and 50% greater than steam cured tubing (QC394). A very economical low-cost 24-hour recording thermometer has all the actuating mechanism and pen built on the door so that the danger of damaging the pen or element is practically zero when charts are being changed because all mechanism swings free and away (QC395).

The highest vacuum ever attained by a steam-jet ejector is claimed by the producer of this new equipment who recommends it for producing vacuums from a few inches of mercury to within less than one millimeter of perfect vacuum (QC396). An automatic water filter which produces a continuous flow of filtered water with automatic elimination of solids has been tried out with unusual success in a number of chemical plants using large volumes of raw water for process work and is now offered generally (QC397).

Chemical Industries,

P.O. Box 1405, New Haven, Conn.

I would like to receive more detailed information on the following equipment: (Kindly check those desired.)

QC 386	QC 392
" 387	" 393
" 388	" 394
" 389	" 395
" 390	" 396
" 391	" 397

Name

Title Company

Address

Booklets & Catalogs

Chemicals

- B43.** Alcefa Chemical Co., 74 Varick st., N. Y. City. 4-page leaflet describes new product, "Neo-Sapine," developed for superfatting of soaps.
- B44.** American Cyanamid & Chemical Corp., 30 Rockefeller Center, N. Y. City. "Natural Resins," is a 40-page booklet describing the physical and chemical properties of all of the commercial natural resins. Contains a wealth of valuable data to the user of such products.
- B45.** American Cyanamid & Chemical Corp., "Waxes," is a 16-page booklet which gives for the important waxes similar technical data.
- B46.** Atlas Powder Co., Wilmington, Del. While this catalog is not intended as a handbook on the use of explosives, over 100 different grades of dynamites and a wide variety of accessories are listed which will aid the user in choosing the supplies and explosives best suited to his job.
- B47.** Bakelite Corp., 247 Park ave., N. Y. City. In view of the "ups and downs" in the Chinawood market Bulletin No. 17, "Linseed and Perilla Oil in Bakelite Resin Fortified Finishes," is a timely contribution. Booklet contains specific formula recommendations.
- B48.** Calco Chemical Co., Bound Brook, N. J. Use of sulfur dioxide in various industries such as leather tanning, oil refining, paper, textiles, refrigeration and air conditioning is described and typical methods of handling are illustrated. Tables giving the physical properties of both the liquid and vapor are included.
- B49.** Ciba Co., 627 Greenwich st., N. Y. City. Data sheet on heavy paper (for easy reference) gives the conversion table for decimal percentages into ounces and grains for the use of dyers.
- B50.** Franklin Research Co., Wilbur White Division, Philadelphia. A 4-page leaflet discusses new product, "Triple Life," a compound designed to prevent paint destruction caused by sunshine, rain, and oxidation. Triple Life acts to prevent oxidation, prevents fading of colors.
- B51.** Commercial Solvents Corp., Terre Haute, Ind. August issue of "Alcohol Talks" is devoted to the story of waxes and alcohol.
- B52.** Givaudan-Delawanna, Inc., 80 5th ave., N. Y. City. "Givaudanian" for August discusses several of the natural resins, absolute and soluble.
- B53.** D. W. Haering & Co., 3408 Monroe st., Chicago. H-O-H Lighthouse is a bi-monthly devoted to questions concerning corrosion problems in boiler feed waters, etc. Current issue discusses chrom gluosate and its uses as an inhibitor.
- B54.** Hercules Powder Co., Wilmington, Del. September issue of "Hercules Mixer" contains an autobiography of William B. Reid and the story of the Providence Drysalts Co., now a Papermakers' Chemical Division.
- B55.** Penn. Salt Mfg. Co., Widener Bldg., Philadelphia. Circular reports on sodium orthosilicate, tradenamed, "Orthosil," a new detergent with exceptional properties of particular interest and use to the heavy duty metal trades.
- B56.** Philadelphia Quartz Co., 121 S. 3rd st., Philadelphia. Each month "Silicate P's & Q's" discusses informally some angle of the silicates. Those interested can receive a copy regularly.
- B57.** Schimmel & Co., 601 W. 26th st., N. Y. City. "Schimmel Briefs" is a monthly publication designed to interest and provide worthwhile information to the users of perfumes.

Price Lists

- B58.** American Pharmaceutical Co., 525 W. 43rd st., N. Y. City. This is the annual catalog of A-P-G products.
- B59.** Fritzsche Brothers, 76 9th ave., N. Y. City. essential oils, perfumes, etc.
- B60.** Mallinckrodt Chemical Works, St. Louis. September price list of chemicals for medicinal, photographic, analytical, and industrial uses.
- B61.** Merck & Co., Rahway, N. J. September price list on medicinal, analytical, technical, and photographic chemicals.
- B62.** R. F. Revson Co., 91 7th ave., N. Y. City. A price list on chemicals that should be of interest to chemists and other experimenters in the field of pharmaceuticals, cosmetics, soaps, and other chemical specialties.
- B63.** Schimmel & Co., 601 W. 26th st., N. Y. City. Price list on essential oils, aromatic chemicals, and allied products.
- B63a.** Heyden Chemical Corp., 50 Union Square, N. Y. City. September wholesale price list.

Equipment

- B64.** R. P. Adams Co., 220 Delaware ave., Buffalo. Data sheets and diagram describe the new AWF automatic liquid filter for the clarification of raw water supplies, said by the manufacturer to be the only one of its type which has ever appeared on the market. A large number of these filters have been installed in chemical plants for the clarification of raw water supplies and filtration of chemicals with outstanding results.
- B65.** Alsop Engineering Corp., 39 W. 60th st., N. Y. City. A new general bulletin describes the Alsop line of mixers, portable stirrers, glass coated steel tanks, filters, fillers, labelers, etc.
- B66.** The Bristol Co., Waterbury, Conn., announces the publication of Bulletin No. 436, covering a new line of round chart recording voltmeters and ammeters for electric utilities and industrial plants. Models for wall, switchboard, flush panel, and pole mounting, as well as for portable use are illustrated with drilling dimensions. A detailed description is given of the new inverted type replaceable movement and of the novel design of the pen arm.
- B67.** The DeVilbiss Co., Toledo. Discusses non-technically (and with illustrations) the difference between the air caps used with lacquer from those used with the new synthetic materials.
- B68.** Flexrock Co., 800 N. Delaware ave., Philadelphia. "Handbook of Building Maintenance," a new, 40-page book which has been printed to assist the plant engineer on day to day building maintenance problems.
- B69.** General Ceramics Co., 30 Rockefeller Center, N. Y. City. New brochure summarizes practice of leading architects and engineers in laying out the laboratories of most of the important educational and research institutions that have been erected in recent years. It is just off the press and is, therefore, right up to the minute. Care has been taken to present the information completely but in a concise and practical form without unnecessary verbiage. It, therefore, merits careful study and filing for future reference by all interested in the equipment of chemistry buildings.

- B70.** General Electric, Schenectady, N. Y. GEA-1366a describes Type KR totally enclosed hoist motors.
- B71.** General Electric. GEA-1326b describes totally enclosed fan-cooled induction motors.
- B72.** General Electric. GEA-1538a describes type K totally enclosed induction motors.
- B73.** General Electric. GEA-1341c describes explosion-proof, totally enclosed, fan cooled induction motors for Class I, Group D, hazardous locations.
- B74.** GEA-1619b describes splashproof induction motors.
- B75.** GEA-2345 describes general-purpose squirrel-cage induction motors.
- B76.** Illinois Clay Products Co., Joliet, Ill. Leaflet lists various fire clay products and "Therm-O-Flake" high insulation material.
- B77.** Ingersoll-Rand, Phillipsburg, N. J. A 24-page bulletin describes Type S Diesel engine of improved design.
- B78.** Johns-Manville, 22 E. 40th st., N. Y. City. The '36 edition, Johns-Manville Industrial Products Catalog is a 60-page book, profusely illustrated; contains a wealth of information and recommendations on high and low temperature insulations for every industrial need, specifications on J-M Bonded Asbestos Built-up Roofs, and J-M Insulated Roofs; detailed information on J-M Corrugated Transite for roofings and sidings; on industrial friction materials; on Transite Conduit, Asbestos Ebony and other J-M electrical materials; on Transite Pressure Pipe for industrial and municipal water lines; and on J-M packings. Among new products described in detail are Transite Kordcut, a thin-walled form of asbestos-cement electrical conduit; Rock Cork Pipe Covering, a mineral insulation for low temperature piping, and J-M Ohmstone, a non-impregnated asbestos-cement sheet for switchboard panels that will stand shock and vibration and is immune to carbonization. Catalog also describes in detail Steeltex Floor Lath and Welded Wire Re-inforcement, and sound control of mechanical equipment.
- B79.** Kux-Lohner Machine Co., 2145 Lexington st., Chicago. A new 14-page, 2 color folder, descriptive and illustrative of the Kux line of Automatic Continuous Rotary Tablet Presses, consisting of 8 models, as well as 4 models of Single Punch Presses, capable of compressing tablets from 1/20 of a grain in weight up to 4 1/2" in diameter.
- B80.** Link-Belt Co., 307 N. Michigan ave., Chicago. "Link-Belt News" for September features story on cottonseed oil mill mechanical handling and driving machinery trends.
- B81.** Link-Belt Co., has acquired manufacturing and sales rights for North America, for the Dunford & Elliott rotary louver dryer, of which many installations have been made in Europe, Canada and Japan. It is offered for the drying of all types of granular materials, coarse or fine, or of irregular shape, size and consistency; all types of crystals and powders manufactured or used in the chemical industry; factory refuse and waste; vegetable products, etc. It has also been employed as a heating or cooling unit; as a general reaction vessel; and for evaporating liquids on a solid substance. Among the materials handled are coal, coke, clay, fertilizers, grain, ores, cereals, salt, sand, sugar, wood chips and bark, cement clinker and all manner of chemicals.
- B82.** Link-Belt Co. A new 24-page illustrated catalog No. 1562, complete with clearance diagrams and dimension tables, on company's 2 distinct types of vibrating screens ("UP" and "PD") for accurately screening such materials as coal, clay, coke, sand, gravel, crushed stone, fertilizer, lime, ore, grain, sugar, chemicals, etc.
- B83.** The Milbourn Co., 905 Henry st., Detroit. A 4-page leaflet describes the various types of "Ply" (to prevent dermatitis) recommended for different chemicals, etc. Company has approached the subject in a really scientific way and will make specific recommendations.
- B84.** International Nickel Co., 67 Wall st., N. Y. City. "Nickelsworth, Process Industries Quarterly" gives an illustrated resume of recent installations of nickel, nickel-clad steel and nickel piping in the process fields. Contains a flow sheet of the soap industry.
- B85.** Oliver-United Filters, Inc., 33 W. 42nd st., N. Y. City. Bulletin No. 122A described the Oliver pressure filter for giving polish to wines, beers, food products, varnishes, links, dyes, and other chemical liquids.
- B86.** Quigley Co., 56 W. 45th st., N. Y. City. Booklet describes "Triple-A No. 20," a special tough, abrasion-resisting anti-corrosive coating for protecting steel and equipment.
- B87.** F. J. Stokes Machine Co., Philadelphia. A new catalog on tablet-making machinery, containing specifications, details of construction and other information relating to all types of machines used in compressing tablets both for the pharmaceutical and industrial fields. Included also are descriptions of drying closets, granulators, mixers, coating and polishing pans, drug mills, etc.
- B88.** Stonhard Co., 405 N. Broad st., Philadelphia. "Facts" is a compilation of questions and answers for industrial maintenance men faced with floor repairs and floors subjected to acids, oils, excessive moisture, etc.
- B89.** York Ice Machinery Corp., York, Pa. New bulletin on vertical single-acting ammonia compressors.
- B90.** The Griscom-Russell Co., 285 Madison ave., N. Y. City. "Compensated Surface" is the term used to describe the transfer surface in a unit for heating or cooling fluids of low heat conductivity as described in a bulletin (1611) which has just been published. This patented design is known as the Twin G-Fin Section. New bulletin graphically explains its distinctive features; and concisely describes how its special form provides the surface required by a fluid of low heat conductivity in the same length of heat transfer element suitable for a fluid of high heat conductivity. Bulletin also lists the applications for which this design has vastly exceeded the results obtainable from conventional types of heat exchangers.

Chemical Industries,
P.O. Box 1405,
New Haven, Conn.

I would like to receive the following booklets; specify by number:

Name

Title

Company

Address

All information requested above must be given to receive attention.

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PEROXIDES
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**CERAMIC AND GLASS
DECORATIONS**
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PLATING CHEMICALS
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NON-FLAMMABLE SOLVENTS . . . for dry-cleaning, metal degreasing, extraction of oils, and many other uses.

Methylene Chloride, Chloroform, Carbon Tetrachloride, Dichlorethylene, Trichlorethylene, TRI-CLENE*, Perchlorethylene, Tetrachlorethane, Pentachlorethane, Beta-Trichlorethane.

CYANIDES . . . for steel treating, electroplating, metal cleaning, fumigation, organic synthesis.

CYANEGG* (Sodium Cyanide, 96-98%), Cyanide-Chloride Mixture, 75%, Cyanide-Chloride Mixture, 45%, Case Hardener, Sodium Cyanide, 30%.

PEROXIDES . . . for bleaching, pharmaceutical and cosmetic preparations, general oxidation purposes.

ALBONE* C (Hydrogen Peroxide, 100 Vol. Electrolytic), SOLOZONE* (Sodium Peroxide), Sodium Perborate, Calcium Peroxide, Magnesium Peroxide, Strontium Peroxide, Zinc Peroxide, Zinc Perborate.

REFRIGERANTS . . . for domestic and commercial refrigeration units.

ARTIC* (Methyl Chloride).

SODIUM, 99.9% . . . reactive chemical for industrial and laboratory work.

P. A. C.* FORMALDEHYDE (Solution U. S. P.) . . . for disinfecting; plastic manufacture; embalming fluid, treating paper, leather, textiles; chemical synthesis.

PLATING PROCESSES . . . for decorative and protective coatings on metal parts.

DUOZINC* (Zinc-Mercury), Electroplating (Sodium Stannate-Acetate), Gold and Silver Cyanides, Copper Cyanide, Zinc Cyanide.

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Raw Materials for Chemical Specialties

For Textiles and Leather

By Andrew J. Kelly

Burkart Schier Chemical Company

WEBSTER defines specialty "a manufactured article of a special kind or for a special purpose." The dictionary definition is apt, for the products of the chemical specialty manufacturer in the textile and tanning fields are "made to order" to suit the individual consumer and his needs. These products seldom have a generalized application. True, the differences are often slight; just enough, in many cases, to make for successful application under varying mill and tannery conditions.

Real Founder Chemical Specialty Business

The dyer or tanner was the true founder of the chemical specialty business. Finding needs in his operations that could not be met by any basic supply, he proceeded to fill these needs himself. Knowing intimately his own requirements, and roughly how to meet them, he concocted compounds that sometimes came close to doing just what was required. Many early sizing and finishing compounds were so created. Occasionally the formulas were of a startling complexity. But the results were there, and the processor was rightly proud of his ingenuity. However, the demands upon the time of the operator in the daily pressure of his work were too great to permit this zest for creation to persist. Running a dyehouse or tannery is a full-time job. So the specialty chemical manufacturer evolved, and he in turn grew into an industry. Today this is a highly "specialized" business, as the name implies, carrying on the tradition of individual products for individual needs. The producer must hence be skilled in the application as well as in the manufacture of his compounds; there must be, and there is, a close contact between producer and consumer. This is so to an extent almost unparalleled elsewhere. The volume of specialty products consumed is evidence of the service they render.

The raw materials of the chemical specialty manufacturer may be roughly divided into two general classes: basic supplies and special supplies. The former would include the heavy chemicals (acids, bases, salts), oils, fats, fatty acids, etc. These products are more or less common to all chemical manufacturers. The latter class, perhaps more important in the field under consideration, would include emulsifiers, bases for soluble oils, certain solvents used in wetting and scouring agents, "mutual" solvents, many sulfonated or sulfated compounds, and a number of the newer synthetic organic chemicals. It will be noted that quite a few of this class are themselves specialties.

As so often happens throughout the chemical industry, the manufacturer of chemical specialties is in turn a large consumer of the products of his field. Sulfonated castor oil, for instance, is an end product in the manufacture of softening and finishing agents, but only an intermediate in the making of many penetrants and wetting aids. A number of the new synthetic organic chemicals are of the nature of chemical specialties—the industry is a good customer for these.

Testing the basic supplies of the specialty manufacturer is rather a "cut and dried" affair. For practically all of the heavy chemicals there are standard methods of analysis in the reference books. The literature of the producers of heavy

chemicals will be found to be of particular help in laboratory work; it offers methods of testing that are a combination of approved procedure and intimate first hand data. To overlook this worthwhile aid is hardly good judgment, for a number of valuable booklets are available.¹ The writer has also found Scotts' "Analytical Methods for a Textile Laboratory"² a handy little booklet in testing chemicals commonly used in the manufacture of textile and tanning specialties. A typical analysis is given for each item considered; this provides the worker with a good idea of what to expect in the technical grades. A review of the methods for detecting the commoner metals, by Trotman,³ is a notable compendium of procedures for finding traces of Fe, Cu, Ca, Mg, Al, Zn, Pb, Mn, Sn, and Cr.

The industrial chemist is constantly looking for quick uninvolved tests, qualitative or roughly quantitative, which will simplify or expedite his work. Someday no doubt there will be a reagent for each element, to determine simply its presence in no matter what combination. Eastman offers a number of organic chemicals which are specific for certain elements. With the microscope the crystals of many compounds may be readily detected, even in mixtures. Many detergents, composed of several alkalies, or of powdered soap and alkalies, reveal a good idea of their composition under low magnifications. Hydrogen ion concentration determinations, easily made with simple colorimetric pH outfits, are of value. Tables of known pH values are generally available and make a handy adjunct in using the pH apparatus for rough testing.

Short Cuts in Analysis

Many helpful "short cuts" in analysis have appeared in trade journals. A few are listed below, with acknowledgments to the inventors and regrets that they are unknown to the writer and so cannot be credited by name.

Test for iron in concentrated sulfuric acid: Take 10 ml acid, dilute to 100 ml with water, make distinctly alkaline with dilute ammonia, and note whether brownish precipitate appears on standing.

Test for lead in concentrated sulfuric acid: Mix a portion of the acid with five times its volume of strong alcohol and note whether turbidity appears.

Test for potash in soap: Incinerate 1 gram of soap, leach ash with 10 ml water, neutralize with acetic or hydrochloric acid, and add a portion of a 10% solution of sodium cobaltinitrite. A yellow precipitate on slight warming indicates potash.

The familiar *brown ring test for nitrates* is quick and efficient: A solution of a soluble nitrate is poured into a test tube containing a crystal of ferrous sulfate. A few drops of concentrated sulfuric acid are poured down the side of the tube. Formation of a brown ring around the ferrous sulfate indicates the presence of the nitrate radical.

To distinguish between sulfonated oil and liquid soap: Dissolve approximately 10 grams of sample in 25 ml of distilled water. Add 50 ml of concentrated hydrochloric acid, heat till separation of fats is complete, and then draw off acid (aqueous) layer. Neutralize this with ammonia, using methyl orange as indicator, then add 1 drop concentrated hydrochloric acid. Dilute to 200 ml

with distilled water, bring to boil, and add concentrated barium chloride solution. Precipitate (barium sulfate) indicates sample is sulfonated oil, while absence of precipitate indicates a liquid soap.

The chemical specialty industry consumes a considerable volume of industrial alkalies. No discussion of them will be made here, but a few notes may be of interest. The comparatively new sodium metasilicate justifies consideration, offering as it does the advantages of a highly soluble silicate in the dry form. This ease of solution is of great aid in preparing scouring oils and pastes. Sodium metasilicate does not show anything like the propensity shown by the more common silicate of soda (water glass) of forming a gel of insoluble silicic acid in acidified solution. It has a fairly high pH (12.2 in N/10 solution) but this is in many cases an advantage. There is a definite and constant $\text{Na}_2\text{O}-\text{SiO}_2$ ratio in this valuable silica compound. It works well in combination with other detergents. Another highly soluble alkali now generally employed in the specialty field is potassium carbonate (pearl ash). It is being produced domestically, insuring uninterrupted supply and more uniform price levels. The liquid form, containing approximately fifty per cent. of commercial K_2CO_3 , is available at no premium in price and is very convenient to use. Shipped in iron drums of about 700 pounds net, it is clean and easy to handle and offers no dusting problem.

Oils, Fats in Specialties

Oils and Fats constitute most of the balance of the basic supplies of the specialty manufacturer. Among those most commonly used are castor oil, olive oil, cod oil, tallow, neatfoot oil, oleic acid, and stearic acid. It is interesting to note here that the industry uses the best grades of these raw materials, usually C. P. or U. S. P. Castor Oil and the best obtainable inedible olive oil, tallow, etc. And government statistics show that of the 7,243,443 pounds of castor oil used in the second quarter of this year 3,057,775 pounds were subjected to sulfonation. Of 2,539,738 pounds of inedible olive oil used 1,485,251 pounds were sulfonated. In other words, over 42% of the castor and over 58% of the inedible olive oil used in the United States in this period went into the manufacture of chemical specialties. Sulfonated oils are a leader among specialties and are heavily used in the compounding of other specialties. The number of applications of these versatile soluble oils is amazing.^{4, 5} For the analysis of oils and fats the work of Lewkowitsch is standard.⁶ However, when buying from a known reliable source of supply much of the analytical work can be dispensed with, the main tests necessary being the determination of the titer and of the saponification number combined with a physical examination of the cleanness, clarity, etc., of the lot. A good grade of commercial red oil, showing 85 to 90 per cent. of oleic acid and a saponification number around 200 or over is usually adequate where oleic acid is indicated. Single, double, and triple pressed stearic acid is available, with the double pressed being a safe bet for most needs in this field. The "bead" form of stearic acid has found favor with many as being easier to handle, weigh, and melt. The slabs are perhaps cleaner to store as there is less surface to become dirty. As far as actual use is concerned there is little to choose—either is satisfactory. Palm oil, rapeseed oil, lard oil, teaseed oil, peanut oil, olive foots, Japan wax and other glycerides are consumed in varying quantities—the application of some of them being of a sporadic nature, largely influenced by prices on oils and fats. When quotations on the more common fatty oils skyrocket as they have this year, the obscure ones come in for close scrutiny.

The "special supplies" of the specialty manufacturer might be roughly described as those whose application is determined empirically rather than by chemical analysis. Many of them are pure chemical compounds in the best textbook sense of the word, as for instance certain of the synthetic organic chemicals,

but the fitness of all for the needs of the industry must be determined by endless "trial and error" experiment. Naturally, this experimental work will have a basis in the knowledge and previous experience of the specialty chemist, augmented by the data sheets and recommendations of the supplier. Here as always intimate knowledge of the ultimate applications of all products is essential. A solvent might have excellent wetting and scouring properties offset by a deleterious action upon some fibers. A base for soluble oils might show great appeal as an emulsifier but be unsuited for application to certain hides or textiles. Analysis alone would seldom indicate these facts.

In determining the suitability of various bases for soluble oils and emulsions the worker must be familiar with the chemistry of colloids. A great majority of the textile and leather chemical specialties are of a colloidal nature. These products consist essentially of the emulsifier and the emulsified portion, though the possibility of side additions is limitless. The emulsifier, or base, is in most cases soap, sulfonated oil, or some sulfonated or sulfated agent. Any soap may be used, but the most common are sodium or ammonium oleate, stearate, linoleate, etc., and occasionally ethanalamine or naphthenic soaps. Often when the base is a simple soap such as sodium or ammonium oleate or stearate it is prepared in situ: soluble solvent compounds are often made by mixing the fatty acid and solvent and then adding the alkali solution. The saponification and emulsification processes are thus combined. Ammonium linoleate is a good emulsifier for mineral oils and can be used in combination with white oils to produce very light colored soluble oils of high quality. Naphthenic soaps are exceedingly efficient mineral oil emulsifiers and are economical to use—many stock lubricants have this base. Some of the condensation products of albumen and fatty acids are also said to show possibilities for compounding with petroleum oils. Soluble mineral oils are employed for oiling raw stock at one end of textile processing and for imparting a desirable finish to the manufactured fabric at the other end. Their importance in the textile and tanning industries is constantly increasing. Concerning the mineral oils themselves, their particular application is fairly well indicated by their color and viscosity, which factors in turn directly influence their cost. The range suitable for specialties runs from the inexpensive pale oils up to the highly refined debloomed white oils costing six or eight times as much. Tendency toward oxidation with attendant discoloration is principally to be avoided in mineral oils, especially when they are incorporated in finishing agents.

Importance of Sulfonated Oils

It has been already mentioned that a notable amount of the sulfonated oils produced goes into the manufacture of still more complex compounds. Sulfonated castor oil is a most versatile and efficient emulsifier.⁷ Its analysis is well-covered in the literature and is also the subject of the United States Bureau of Standards Bulletin CS43-32. Among the many solvents compounded into soluble or emulsifiable form with sulfonated oils are pine oil, cresylic acid, ethylene dichloride, propylene dichloride, dichlorethyl ether, tetralin, hexalin, benzol, carbon tetrachloride, trichlorethylene, etc. Little can be said here concerning most of these. However, it seems to be fairly well established that the wetting power of a soluble pine oil is in proportion to the tertiary alcohol content of the pine oil used. A recently published paper considers this subject at some length.⁸ Now on the market are pine oils containing as high as 85% of tertiary alcohols. Regarding cresylic acid, one writer remarks ". . . there is, perhaps, no chemical on the market, used in chemical processes, which varies as much in composition and yet strictly adheres, commercially speaking, to the name under which it is sold, as 97-99% pale cresylic acid."⁹ But experience has shown that a good grade for specialty use is one with a fairly narrow distillation range,

beginning at about 190° C. and dry under 220° C. This eliminates the very volatile constituents and also the tarry residue sometimes found. The newer synthetic organic chemicals are usually supplied on a basis of guaranteed chemical analysis, but such factors as influence upon surface and interfacial tensions, action upon fibers, ability to blend well, effect upon stability and appearance of finished products are still the most important. Admitting that a knowledge of the molecular structure will be of value in indicating the probable field of application of a solvent, the foregoing statement nevertheless holds true.

The designation "mutual solvents" may be roughly applied to a number of compounds that are used as coupling agents, clarifiers, stabilizers, etc. They are usually chosen to aid in the work as well as in the stability and appearance of the products into which they are incorporated. Alcohol is an important member of this group. Common denatured alcohol can often be replaced advantageously by synthetic methanol. This latter contains no water, and, naturally, no denaturant. Diethylene glycol monoethyl ether, ethylene glycol monoethyl ether, diethylene glycol, and ethylene glycol will all, under certain conditions, act as stabilizers in specialty compounds. At the same time their hygroscopic glycerine-like nature adds desirable softening properties to the compounds. The ability, possessed by these and other organic chemicals, of increasing the mutual miscibility of oils, solvents and the like is of prime importance to the specialty compounder. The desire of manufacturers to offer products which will, in a single package, produce results otherwise obtainable only from a multiplicity of items sometimes results in formulas of a rather complicated structure. Mutual solvents help to make such formulas practical and so show promise of finding a rapidly increasing application.

Detergents and Wetting Agents

Some of the new detergents and wetting agents possess possibilities for incorporation in specialties. Among these are the sodium salts of sulfonated fatty alcohols (Gardinols, Duponols, etc.), of alkyl naphthalene sulfonic acids (Alkanols, Nekals, etc.), of alkylated aryl compounds (Areskap, Aresket, etc.), of oleic acid esters of hydroethane and aminoethane sulfonic acids (Igepons), of abietene sulfonic acid (Neopen), and condensation products of albumen and fatty acids (Lamepones, etc.). The patent background of the varied items is highly involved. Before utilizing them it is necessary to consider not only their practical aspects, but their legal aspects as well. Generally speaking, their technical importance lies in an ability to form neutral solutions of a high detergency or wetting power, plus an effective resistance to hard water. Some of these products are said to be good bases for emulsions.

Starches, gums, glue and gelatin are important raw materials to the specialty manufacturer. About the technology of these colloids many volumes have been written. They were formerly employed mainly in sizing and finishing agents, and to some extent in a few delusterants. Glue found use in certain products applied to ingrain work. However, with the advent of the popular one-bath splash-proofing and water-proofing compounds these items have assumed considerably greater importance. This is because of their efficiency in acting as protective colloids. With the aid of glue for instance it is possible to prepare stable emulsions of such incompatibles as sodium stearate and aluminum acetate.¹⁰ Glue is not alone in possessing this protective quality. Concerning gums, so much progress has been made in the production of modified starches that it is said to be possible to duplicate with them many if not most of the properties and effects of the natural gums. These starch gums have much to recommend them and justify serious consideration. They are clean, uniform, and fairly inexpensive. The ideal preservative for starch and gum pastes has never been realized, but the sodium and ammonium fluosilicates are capable antiseptics.

They are active in very low concentrations, and cost but little. Salicylanilide ("Shirlan") has received high praise as a preservative, but at the present time it is being applied directly in the finishing bath for fabrics rather than in specialty compounds.

The raw materials of the specialty manufacturer are, like his finished products, of endless number and variety. Almost any new chemical may possess possibilities for his use and so must be examined and considered. Or the development of other specialty products may open up for study an entire group of materials not formerly applicable. Eternal vigilance is the price not alone of liberty, but of existence in this field. The writer has hardly more than touched upon the high spots of the more important supplies, with doubtless many omissions. No mention has been made, for example, of the many inorganic salts used in delusterants, finishes, weighters, etc., such as sodium sulfate, barium chloride, magnesium sulfate, china clay, silicic acid, among others. No mention has been made of the fat substitutes which have been offered and which will possibly assume importance. No mention has been made of sodium hexametaphosphate, yet it can mean the entire rejuvenation of the common soap that has had such a buffeting of late. Those familiar with this remarkable soda phosphate know the truth of the above statement. And so on. This is a subject without an end. In fact, the possible raw materials of the chemical specialty manufacturer may well be likened to a current phrase of the astronomers. The Universe, they say, is "finite but unbounded."

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Arsenic Compounds in Wood Preservation

Huge surplus world stocks of arsenic make new uses for this product or its compound highly desirable. Chemists of the Boliden mining company, in particular, are active along these lines and are investigating different arsenic compounds as fungicides for wood preservation.

Because of its low solubility and cheapness, zinc arsenate is considered the most suitable of the salts tested. Arsenates of copper, manganese, and chromium are equally efficient, but are more expensive. The difficultly soluble salts of the heavy metals are preferably applied by means of a double impregnation process. Wood is 1st impregnated with sodium arsenate, and afterwards with a solution, for instance, of zinc chloride, by which zinc arsenate is precipitated in the wood tissues.

Resistivity of the different arsenates against washing was determined by tests in running water. After washing, for 14 days 88% of the amount of arsenate originally present was found in test pieces impregnated with arsenates of heavy metals applied by double impregnation, whereas only 35% of calcium and magnesium arsenates applied in the same manner was retained, and only 2% of calcium arsenate applied by single impregnation. C. A. Robak, *Industrial & Engineering Chemistry* (News Edition).

Cements—Formulation

For Binding Metals to Wood, Glass and Stone

By Charles F. Mason, Ph.D.

THE number of cements is legion and their properties run the entire gamut of resistances with properties, which fit them for every conceivable purpose; and in spite of scientific investigations, which indicate that more wisely chosen and compounded mixtures of each type serve the purpose better; if used correctly, the concoction of newer ones still continues.

This condition is perhaps being promoted by the introduction of newer synthetic binding materials and recently developed fillers, which due to slightly different properties must be used in varying amounts. Advantages of price and misdirected advice by salesmen will continue to keep the composition of these products fifty per cent. mystery and fifty per cent. filler. Hence, until a better method of classification is developed and until more is known about the properties of each mixture under use, one must be content with tables of those which have stood the test of trial, and from such mixtures technical men can easily formulate new ones to meet special needs by elimination of components soluble in contacting liquids and substitution of components insoluble in them.

The present tendency is to classify chemically resistant cements in groups according to one component, to which the cementing action is attributed and as a result we find them under such headings like glycerol litharge, sodium silicate, oxychloride, and miscellaneous. This is, of course, the simplest method and perhaps the most scientific, but the writer feels that in classifying a group of mixtures consisting of at least six components, the hardening action of which is based upon evaporation of solvent, cooling, chemical action or all three operating simultaneously, the most useful classification is according to purpose.

In view of the fact that chemically resistant cements comprise only a part of the field and are undergoing development upon semi-scientific lines to fit them more suitably for that particular industry, their application for general purposes and to other industries is out of the question; hence, from the formulae submitted in this article one can see that no class of raw materials is particularly favored and even though these mixtures may serve other purposes, they or modified forms of them will usually suffice for special needs.

1. Metal and Glass

- 50 White Shellac
- 5 Tri-Cresyl-Phosphate
- 45 Pumice (Powdered)

This mixture is melted with constant stirring and shortly before use any one of the following mixtures are stirred in with due consideration of the purpose to which it is to be applied.

- a. 18 Copal Varnish (Solvent Alcohol)
- 54 Linseed Oil (Raw or Boiled)
- 14 White Lead
- 14 Red Lead
- b. 25 Powdered Silica
- 25 Slaked Lime
- 50 Litharge

Warm linseed oil varnish should be stirred in to the formation of a workable paste.

- c. 50 Burgundy Pitch
- 12 Black Pitch
- 25 Yellow Wax (Bees wax)

These are melted and then the filler is stirred in.

- 13 Kieselguhr.

The following mixtures are used independently.

- a. 7.5 Sodium Hydroxide
- 22.5 Rosin
- 40.0 Water
- 30.0 Gypsum (Dehydrated)

This is to be applied while warm and hardens in one hour.

- b. 52 Rosin
- 26 Tallow or Stearic Acid
- 22 Red Lead

This is applied hot and is satisfactory for glazing of skylights which have metal frames.

- c. 25 Cumar
- 15 Solvent
- 25 Kieselguhr
- 35 Feldspar

The above formulae fall into the conventional class of organic binder cements and, all except one being resistant to water, none are resistant to alkalies, and organic solvents like aliphatic and aromatic hydrocarbons which necessitates other combinations for such liquids and illustrates the necessity of a wise choice.

2. Metal and Wood

- a. 66 Rosin
- 28 Venice Turpentine (Imported)
- 6 Linseed Oil

This is melted before use and applied hot.

- b. 50 Shellac (White or Orange)
- 50 Gutta Percha

Melt, stir well and pour into molds for use like sealing wax.

- c. 23 Gelatine
- 23 Glue
- 46 Acetic Acid (20%)
- 1 Alum
- 7 Alcohol

Used warm upon iron and wood.

- d. 77 Viscous Glue Solution
- 23 Linseed Oil Varnish

Used warm.

- e. 38 Whiting
- 53 White Lead
- 9 Linseed Oil Varnish

For joining zinc and wood.

- f. 70 Rosin
- 30 Gutta Percha

Used warm for joining aluminum and wood

- g. 50 Viscous Glue Solution
- 45 Slaked Lime
- 5 Glycerine

For joining wood to brass after the latter has been etched with acid.

3. Metal to Metal

- a. 50 Linseed Oil Varnish
- 50 Fresh Lime

Apply hot to clean surfaces.

- b. 25 Copal Varnish (Spirit)
- 9 Linseed Varnish
- 5 Venice Turpentine
- 2 Turpentine (domestic)
- 9 Marine Glue
- 50 Slaked Lime

- c. 10 Graphite
- 68 Manganese Dioxide
- 2 Clay (dry)
- 4 White Lead
- 2 Red Lead
- 14 Linseed Varnish

- d. 30 Powdered Glue
- 50 Slaked Lime
- 20 Sulfur

Applied warm to zinc plates.

- e. 34 Zinc Dust
- 66 Whiting

This is stirred with a Sodium Silicate solution of 33° Bé., and 1.3 to 82 ratio until the desired consistency is obtained. It is serviceable in joining Zinc to Zinc and can be polished upon exposed surfaces.

- f. Zinc Oxide
- Zinc Chloride Solution

The solution is zinc chloride dissolved in water to a specific gravity of 1.80 which corresponds to 63% of the anhydrous salt. This is stirred with the dry zinc oxide to the desired consistency. It dries slowly but becomes very hard.

- g. 30 Casein
- 35 Slaked Lime
- 35 Quartz (powder)

This is stirred with water until the desired consistency is obtained and is either used at once or preserved in closed containers after phenol or formaldehyde have been added to prevent putrefaction.

4. Metal and Stone Ware (Glazed)

- a. 30 Litharge
- 30 Silica (powder)
- 30 Gypsum
- 10 Whiting

Stir with linseed oil varnish to the desired consistency.

- b. 80 Rosin
- 10 Venice Turpentine
- 10 Fresh Lime

Melt and apply hot.

5. Metal and Stone (Unglazed)

- a. Whiting
- Sodium Silicate

The sodium silicate is a solution of 38° Bé. and 1.3 to 8.2 ratio. They are stirred until the correct consistency is obtained preferably by adding the solution to a known weight of the filler.

- b. 90 Iron Filings
- 3 Ammonium Chloride
- 7 Acetic Acid (6-8%)

The filings are to be finely divided and free of oil or grease.

6. Metal Fillers (For crevices, faults)

- a. Antimony Powder
- Sodium Silicate

The solution is of the same specifications as those mentioned in other formulae and is stirred in for the desired consistency.

- b. Lacquers of high viscosity
- Celluloid in Acetone or Ethyl Acetate
- Cellulose Acetate in Acetone

Asbestos or other filler is stirred in until the correct color and consistency are obtained.

- c. 95 Iron Filings
- 3 Ammonium Chloride
- 2 Sulfur
- Water

One drop of concentrated sulfuric acid starts the reaction and it hardens in a few days.

- d. 12 Gum Arabic
- 12 Gypsum
- 12 Iron Filings
- 64 Silica Powder

This hardens to a water and fire resistant coating.

7. Metal Cements (Low melting point alloys)

- a. 34 Lead
- 66 Bismuth

Melting Point 94° C.

- b. 20 Lead
- 30 Zinc
- 50 Bismuth

Melting Point 100° C.

- c. 18 Lead
- 18 Zinc
- 64 Bismuth

Melting Point 93° C.

- d. 10 Lead
- 40 Zinc
- 50 Bismuth

Melting Point 120° C.

- e. 27 Lead
- 13 Zinc
- 50 Bismuth
- 10 Cadmium

Melting Point 70° C.

- f. 40 Lead
- 45 Zinc
- 15 Bismuth

Melting Point 160° C.

- g. 14 Lead
- 86 Zinc

Melting Point 200° C.

These alloys are satisfactory in joining bronze, brass, copper, zinc, lead, Britannia metal, iron, tin, and conditions must be established for heating the parts to be joined before the molten alloy is poured in.

- h. 25-35 Copper
- 75-65 Mercury

When these components are heated to about 100°C. with stirring, it takes on a white plastic appearance and can be injected into the smallest crevices where it hardens after twelve hours with no volume changes.

Consideration of this collection of formulae which are far from complete makes it obvious that universal cements sold in one package are well nigh impossible. Consideration of some of the materials to be joined like Celluloid, plastics, leather, wood, paper, pasteboard, textiles etc., is one indication of the breadth of the field and in cases where the life of the joint and the joined parts are of minor consideration animal glues, casein cements with different fillers, and cellulose lacquers are the types sold to a large extent in the homes. Many of the smaller industries use water soluble types like animal glues, starches, dextrans and gums.

Barium Soaps in Specialties

A modified barium soap, useful in paints, polishes, linoleum, insecticides, cellulose lacquers, and water resistant-materials because of its plasticity, is prepared by the partial saponification of a drying oil such as linseed oil by heating in an autoclave in the presence of an amount of barium hydrate corresponding to about two-thirds of the amount required for the complete saponification of the oil and of an amount of water such as to obtain after cooling, and after removal of the glycerine-containing water, a plastic barium soap.

Resultant material, treated with turpentine oil at 100° C. in the proportion of 40 parts in weight of plastic material for 60 parts in weight of turpentine, gives, it is claimed, a mass which is still liquid at the ordinary temperature. Material is thus different from the barium soaps obtained by treating linseed oil with an amount of barium hydrate sufficient to saponify the oil completely in the autoclave at 120° C., in the presence of water; latter barium soaps when heated with turpentine oil give colloidal jellies which after cooling are solid for a proportion of 25 parts by weight of barium soap for 75 parts by weight of turpentine.

In an example, 300 kilogs of linseed oil are heated in an autoclave at 120° C. with 200 kilogs of water and 120 kilogs of barium hydrate ($\text{Ba}(\text{OH})_2 \cdot 8\text{H}_2\text{O}$) for one hour; mass is then allowed to cool, and the glycerine-containing water is withdrawn. Barium soap remains in the autoclave and is collected; it weighs in the wet state about 390 kilogs; it is a yellowish plastic material.

Specific Directions for Use

If 40 kilogs of this product are heated in a closed vessel at about 100° C. with 60 kilogs of turpentine, a cloudy liquid is obtained after cooling, which when mixed with pigments (for instance, with 100 kilogs of red lead or with 50 kilogs of zinc oxide) yields a very stable paint of high covering power, and drying after about half an hour. In this paint the particles of pigments are coated with a layer of plastic barium soap, acting protectively against the action of rain, snow, etc.

Solution in turpentine oil of the plastic material may also, it is claimed, be advantageously used for waterproofing textiles. Paper and cardboard may be treated in a similar manner. Concrete and plaster objects may be coated with the solution; after the solvent has been evaporated, they are waterproof.

New material, on being heated in a proportion of 60 parts by weight of white spirit with 40 parts by weight of barium soap, gives a colloidal jelly which is semi-solid in the cold. This colloidal jelly is very useful for holding pigments in suspension, for instance, carbon black and plumbago for the manufacture of liquid black polish for stoves. English Patent 450,288, '35. Process was developed by G. Deguide, Namur, Belgium.

For acute mercury poisoning an intravenous injection of grape sugar and physiological common salt solution is recommended. *Chemiker Zeitung*, Aug. 22, '36.

STANDARD SILICATE of SODA

1

PURITY

● Standard Silicate is of unexcelled purity—there is no higher commercial purity standard in the Silicate Industry than "Standard". Standard purity accounts in great measure for Standard Silicate's constant level of dependability.

2

GRADING

● Standard grading is exact. Rigid laboratory control and scientific precision in every step of the manufacturing process is your assurance that the grade you order is the grade we supply—today and every day.

3

UNIFORMITY

● Standard's scrupulous care in grading applies with equal effect for uniformity. Each grade of Standard Silicate is uniform in content—uniform in action. Because we know how to make it, you know what you're getting—always!

● Standard Silicate of Soda is supplied in all commercial grades—or any special grade—for use as a deflocculant . . . detergent . . . adhesive binder . . . sizing . . . protective coating . . . source of gelatinous films and gels, or wherever Silicate is indicated in your present operations or future plans. If you have a special need, consult "Standard"—our technical and manufacturing cooperation is instantly available. Standard Silicate's four factories and national warehouse distribution system assures prompt execution of your orders and equally prompt, dependable delivery.

THE STANDARD SILICATE COMPANY

KOPPERS BUILDING

PITTSBURGH, PA.

LOCKPORT, N. Y.
JERSEY CITY, N. J.

Plants at

MARSEILLES, ILL.
CINCINNATI, OHIO

"STANDARD"
*Always a good
silicate specification . . .*

Household Specialties

Fumigators, Exterminators to Meet in Cleveland

With details of the coming convention of the National Association of Exterminators and Fumigators to be held at the Statler in Cleveland, Oct. 26-28th finally completed, those in charge of the arrangements are confident that previous registration totals will be shattered. Over 300 are now expected at the 3-day sessions. Membership in the association is not necessary for exterminators and others allied with the exterminating field to attend. A warm welcome awaits all.

A splendid business program has been arranged and the convention will be addressed by a number of prominent men. Among the speakers are Dr. E. A. Back, principal entomologist, Insects Affecting Man and Animals, Bureau of Entomology of the Dept. of Agriculture; Dr. Phil W. Heerdts European authority in insect control; Prof. J. J. Davis, chief in entomology, Purdue University; Mr. E. M. Mills, Bureau of Biological Survey, Massachusetts State College, Amherst, Mass.; Dr. Alfred Weed, entomologist, N. Y. City. Many representatives of the manufacturers and supply houses will also be present to assist.

Heretofore a greater number of speakers addressed the convention and in each case an opportunity was given for questions and answers. It was found that there was not sufficient time to permit for individual participation on the part of the individuals in the industry. Program this year is designed to permit for greater participation on the part of individuals by means of the "Research Clinics." Many have specific problems with specific pests and to that end there has been set up the informal "Research Clinics" that there may be an interchange of experiences as well as technical advice offered. Each of the clinics will be in charge of men who have been successful as well as having in attendance technical men associated with manufacturers and supply houses.

Those attending will find an increase in the number of supply houses taking exhibit space. The entertainment side of the convention has not been neglected in the plans and those attending are assured a pleasant as well as a profitable time. William O. Buettner, secretary of the association, 3019 Fort Hamilton Parkway, Brooklyn, N. Y., will gladly send a copy of the complete program to those interested.

N. Y. Exterminators Form Local Association

With a charter membership of 38 firms, a N. Y. City association of exterminators has been formed with the corporate title, "Associated Exterminators and Fumigators of N. Y." Invitations to other firms in the Metropolitan area to join have

been extended. Officers of the new organization are: William O. Buettner president; Merwin H. Horwitz, vice-president; Arthur W. O'Conner, secretary; and Frank Rauch, treasurer.

Employers Refuse "Closed Shop"

Early last month the association through its president sent a letter to all employees of members of the association restating the employers stand on the question of an "open shop" in the Metropolitan area, the principal point of difference. The employers' negotiating committee has offered to confer with the strikers on all matters except the matter of a "closed shop." The overwhelming majority of employees have already returned to work.

Johnson's Golden Anniversary Offers

S. C. Johnson & Son, Inc., is capitalizing successfully on its 50th year in business through extensive advertising of 3 combination "anniversary" offers of its waxes and other products.

The "tradition" theme, often used in connection with anniversary events, was largely displaced in favor of a policy of presenting especially attractive values to consumers, when Johnson began to plan its '36 sales plans.

The current offer involves a can of Johnson's auto wax free with one pint of auto cleaner and polish, for 59c. Products are packaged in a single carton, a procedure followed in each of the 3 '36 deals. Combination is being advertised on the company's radio program, "Fibber McGee and Molly."

Fall offer will comprise a new combination of Johnson products. Much the same list of newspapers as were used in the spring campaign will figure in the fall effort.

Clorox Reduces Capital Structure

Clorox Chemical Company stockholders recently voted approval of the capital reduction plan submitted by the directors, all of whom were reelected, as were the present officers. Proposal was to reduce the corporation's capital by the amount of \$82,046.82, from \$1,219,606.82 to \$1,137,560, thus increasing the capital surplus account by a part of the amount charged to that account in writing off advertising and market development costs, eliminated from the balance sheet as of June 30th, and also giving the shares a stated value of \$10 a share. Directors voted the regular quarterly dividend of 65c a share payable Oct. 1st to holders of record Sept. 19th.

Tanner Link-Up with Polish Maker

Hide & Leather for a number of years has been conducting a campaign in its editorial pages against what it calls "inferior brands of shoe cleaners, particularly for whites." In The Sept. 19th issue it states: "With so many inferior brands on the market, we have wondered why it would not be a good idea, and ultimately a profitable one, for footwear manufacturers to link in with cleaners they believe trustworthy and suitable to their output—a campaign that would eliminate many a distressing letter-of-return from the retailer, and would only involve, for its success, cooperation between the bodies involved."

"It was pleasing, then, to note at the Leather Opening this week that the Allied Kid Co. has done this very thing—not for whites, to be sure, but for its Shadow Kid. And in manner which we have advocated, where convenient, that manufacturers put their seal of approval upon a dressing it believes trustworthy for its product. Allied has done this in connection with its Shadow Kid."

Gold Dust's Personnel Changes

The following changes took place in the Gold Dust Corp: Elected vice-presidents of the company: F. B. Zimmerman and Guy Lemmon. Resigned as director and vice-president: Frederick K. Morrow. Named general manager of the newly formed soap division: Stewart W. Coleman manager of the Geo. E. Marsh Co. Resigned as director: Hollyday S. Meeds, Jr.

Gold Dust has divided its soap and shoe-polish operations into 2 separate organizations.



Cast of "Bachelor's Children" radio program sponsored by Cudahy Packing (makers of Old Dutch Cleanser) over the Columbia and Mutual Systems 5 days a week at 9:45 A. M. Roche, Williams & Cunningham, Chicago, is the agency.

Hammond in New Plant; Buys Plantation

Hammond Paint & Chemical, Beacon, N. Y. manufacturer of insecticides, both household and agricultural, and other chemical specialties, has purchased the former Beacon Tire plant and will remodel extensively, according to Dalton B. Faloon, head of the firm. Company has also purchased a plantation in Lima, Peru, to insure adequate supplies of rotenone. Mr. Faloon plans to visit Peru this winter when plans will be drawn up for a milling plant. First crop is not expected for 3 years.

Tests for Detecting Hydrocyanic Acid

Exterminators and chemists handling prussic acid, prussiates, cyanides, etc., will find "Determination of Fumigants—Detection and Determination of Residues of Hydrogen Cyanide," by A. B. P. Page and F. P. Gloyns, *British Chemistry & Industry*, July 31, '36, p209T, highly instructive. Minimum toxic concentration is considered, current methods of detection and determination in air are discussed.

Household Soap Prices Rise

Rising raw material prices and continuance of processing taxes on soap oils which increase operating costs, have brought about an advance of 3c a gross in toilet soap prices. Colgate-Palmolive-Peet Corp. has increased Palmolive by this amount and P. & G. has raised the price of its leading hard-milled toilet soap, Camay, 30c to approximately \$7 a gross. A similar advance was made about 6 months ago.

Companies Using Premiums

Premiums continue to be featured in the sales programs of a number of chemical specialty companies. Reported last month: Colgate-Palmolive-Peet an offer of a bath brush for 50c and 3 Palmolive bands; same company is pushing Concentrated Super Suds with a Mickey Mouse balloon toss-up.

Advantage of Lethane Mixtures

D. F. Murphy and G. B. Vandenberg of the Rohm & Haas laboratories report in an article in *Industrial & Engineering Chemistry*, Vol. 28, No. 9, that the substitution of part of the pyrethrum or rotenone with Lethane 384 greatly increases the knockdown and kill of household sprays.

England to Adopt Fumigation Regulations

Passage is likely in the near future in England of The Hydrogen Cyanide (Fumigation) Bill which will give the Home Secretary power to make regulations controlling both the generation and use of HCN for fumigation purposes. Bill in present form exempts open-air fumigation, but may be amended to include such work, as well as to provide regulations for transportation and storage. Such regulations are in force in many parts of the U. S. and on the Continent.

Purex (Household Bleach) to Invade East

On the strength of last year's sales of 10,000,000 bottles of bleaching, disinfecting solution, Purex, "the west's best selling bleach" (according to admen's magazine, *Tide*) is preparing to invade the East. Pursuant to that aim, they're testing copy (via Lord & Thomas) in Houston, Dallas, Fort Worth, San Antonio dailies.

In black and white, with cartoon panels, the copy describes "the sunshine way" to make things white and pure, offers 14 prizes for best housewife reasons for using Purex.

Campaigns—Advertising—Agencies

On Sept. 7th Sherwin-Williams, through T. J. Maloney, Inc., started 10 weeks of spot broadcasting for Enameloid and Semi-Lustre paints over 75 stations. Time ranges from half-minutes to 15-minute participation in group programs. Wherever possible dealers' names are mentioned.

A total of 75 newspapers, including 2 newspaper magazine groups, 5 magazines and a radio program will be used by P. & G. for its 3rd \$1,000 a year for life contest for Camay Soap. Copy broke Sept 15th. Pedlar & Ryan have the account.

S.-W. has decided to repeat its Sunday afternoon series of Metropolitan Opera auditions over the Red NBC network, using Edward Johnson and Dr. John Erskine, expecting to try out at least 100 singers every week to select a handful for each of the 24 weekly programs. Last year 4 of the "discoveries" won Metropolitan contracts.

Lever Brothers began a 15-minute, 4-a-week morning program for Rinso over 70 stations last month, through Ruthrauff & Ryan.

Metal Textile Corp., Orange, N. J., appoints Mackay-Spaulding Co., N. Y. City, as advertising agency for "Chore Girl," a utensil cleaner and windshield sleet remover.

Dri-Brite, Inc. is advertising in the *American Weekly* offering a free trial can of liquid floor wax. Sample can is attached to the regular can, and when the purchaser buys a regular can, he simply tries the sample, and if it is not satisfactory he returns the regular size can and gets his money back.

National Carbon is warming up its Prestone (anti-freeze) dealers with sectional "pep" meetings at which "Going Places," a new 6-reel motion picture and "Spills and Thrills," a new short, are being shown.

Four Detroit Specialty Houses Formed

Four new companies were reported last month in Detroit:—Hydrol Soap Products, 921 Winder st., general line of laundry chemical specialties; Excelso Products at 734 Riopelle st., a new washing powder, "Excelso"; Septo Laboratories, 3401 McClellan ave., "Septo," a detergent; Wyo Products, 407 E. Fort st., "Glasglo," a glass and general household cleanser.

Derris Cultivation in the East Indies

Interest of American manufacturers in derris or tuba root as a source of insecticide materials has resulted in some active cultivation of the plant in the East Indies region as well as in the Philippines, according to C. C. Concannon, chief of the Commerce Dept.'s Chemical Division.

Federal Trade Commission Notes

Misrepresentation of the nature, merit and value of cleaning fluids is alleged in a F. T. C. complaint issued against Joseph Lewin, trading as Leev-No-Ring Chemical Co., 207 W. 17th st., N. Y. City.

Flexrock Announces "Cleanbrite"

A new paint cleaner called "Cleanbrite" has been introduced by Flexrock Co., 800 N. Delaware Ave., Philadelphia. It not only removes dirt but brings the painted surface up to its original brightness, according to claims.

N. Y. City May Buy Soap for Schools

Soap manufacturers are watching with keen interest the possibility that N. Y. City will include in the '37 budget an item for the purchase of soap for the public schools. The Board of Education is asking for a \$50,000 appropriation.

Montgomery to Higgins Ink

James H. Montgomery, Los Angeles, former sales manager and buyer of the stationery division of the Los Angeles News Co., is appointed representative of Chas. M. Higgins & Co., Inc., makers of Higgins' drawing and writing inks and adhesives, for the Pacific Coast and Mountain States territory.

Insecticide Makers Pick Dec. 7 and 8th

National Association of Insecticide & Disinfectant Manufacturers has set the date for the December meeting. Members will gather at the Penn Athletic Club, Philadelphia, on Dec. 7 and 8th. Convention committees are already at work and will within a short period have a tentative program to submit to the membership. Dr. Robert C. White is working very hard to arrange a program that will be an outstanding one and that will bring credit to Philadelphia. Besides heading his own company, Dr. White is the comptroller of the city. Members are urged to make early reservations at the club. Those who cannot be accommodated at the club will be taken care of at the Hotel Warick, which is next door.

Industrial Specialties

Orthosil, New Metal Cleaner Marketed

A chemical development of prime importance to the steel fabricating and finishing industries is the recently announced commercial production of anhydrous sodium orthosilicate (Na_4SiO_4). Material is in the form of white, free-flowing granules readily soluble in water. It is sold under the name "Orthosil."

The chemical dissolved in hot water is effective in removing all types of soil commonly found on steel in industrial processes, except that which can be removed by "pickling" in acid. It is an ideal detergent in the cleaning of steel preparatory to tinning, electroplating, vitreous enameling, and painting. It is suitable for use in any type of steel cleaning equipment which uses alkaline detergents. It is particularly efficient in electrolytic cleaning apparatus due to the high electrical conductivity of its solutions.

Anhydrous sodium orthosilicate in solution has a pronounced tendency to "wet" steel, making for quick penetration to the surfaces of the metal itself and the consequent freeing of grease and dirt. When thus freed, the soil takes the form of an emulsion or suspension. Due to the excellent deflocculating properties of the chemical, this soil is held in dispersed condition throughout the system, and redeposition of dirt on the metal is prevented. Solutions of the new salt are readily rinsed from steel with ordinary water.

In contrast to many other alkaline salts used for detergent purposes, Orthosil contains no water of crystallization. This naturally makes for economical shipping and handling. Due to its concentrated form and the superior detergent properties mentioned above, Orthosil is reported both on laboratory scale and in regular plant operation to be considerably more efficient than any of the alkaline detergents previously available commercially.

Factors in Use of Soybean Oil in Soaps

In an article on soybean oil for soap making A. A. Horvath gives the following conclusions: (1) The lathering capacity of soybean oil soap is not much affected by the hardness of the water; (2) The caustic soda lye used in the initial saponification step of soybean oil should not exceed 8.5° Bé; (3) For curd soaps soybean oil should be used only in mixtures with other fats and oils; (4) Soybean oil is very suitable for the manufacture of soft soap.

The hydrolysis of soybean oil by Twitchell reagent and the manufacture of soap from the fatty acids are discussed. *Chemistry & Industry*, British, Sept. 4, '36, p691.

Anderson-Prichard Offers Service to Dry Cleaners

Anderson-Prichard Oil has made available for dry cleaners a "test piece service." Service is under the supervision of John Licata, eastern division sales manager, and is handled directly by Charles Gault, who for 2 and one-half years was assistant to Dr. Pauline Beery Mack, Professor of the Textile Chemistry Dept., Pennsylvania State College.

There is no charge for this service, although the monthly service is limited to "Stod-Sol" customers with the exception that Anderson-Prichard will give any non-customer cleaner the service free for a period of 2 months. Assistance will be rendered through suggestions as to properly reconditioning cleaning systems and the proper use of dry cleaning aids.

Grasselli Develops Electroplating Control Kits

Grasselli Chemical is offering the electroplating trade test kits for the control of cadmium and zinc plating solutions. Three kits have been developed for this purpose: For the determination of cadmium in cadmium-cyanide plating solution; for the

determination of zinc in alkali-cyanide or acid-zinc plating solutions; for the determination of the total sodium-cyanide content in zinc or cadmium plating solutions.

\$1,000 Prize for Tannic Acid Stain Remover

National Cleaner & Dyer is offering a \$1,000 prize for an efficient, practical, commercially-workable means of removing—completely and permanently—set tannin (tannic acid) stains from all kinds of fabrics including those consisting in whole or in part of wool or silk, without damaging or harming fabric or colors.

Automotive Specialties

U. S. Rubber Products Offers Line of Accessories

A new line of automotive accessories, featuring several new products, is being introduced by U. S. Rubber Products, Inc. New products include an hydraulic brake fluid which has an operating range from 250° F. above zero to 40° F. below zero; a white rubber tire coating, described as a compound solution of rubber and white pigment which is self-vulcanizing; auto body cleaner; auto top sealer; radiator solder; and others. U. S. Rubber has also launched a new packaging program.

Du Pont Changes "Sol-Kleen" to "Prep-Sol"

A new trade name, "Prep-Sol," has been chosen to identify the du Pont product formerly known as "Sol-Kleen," which is for use by refinishers of automobiles to clean and prepare old lacquer and synthetic finishes for recoloring with "Duco" and automotive "Duplex" finishes.

Automotive Chemical Specialty Makers to Meet in Chicago

So far no definite date has been set for the 1936 annual meeting of The Automotive Chemical Specialties Manufacturers' Association except that the sessions will be held in Chicago sometime during December. Quite likely much of the floor discussion will be given over to the particular problems of the industry arising out of the passage of the Robinson-Patman Bill. Noah Van Cleef of Van Cleef Bros., Chicago, is the secretary of the organization.

Agricultural Specialties

Demands Coloring of Arsenates

Regulations requiring manufacturers to use artificial coloring in calcium and lead arsenate, was recommended last month by H. W. Nixon, Alabama state toxicologist, as a means of protecting against accidental poisonings.

"Within the last 4 months," says Mr. Nixon, "at least 40 people in Alabama and a larger number of domestic animals have been accidentally poisoned because these 2 chemicals were mistaken for flour, which they resemble in appearance."

Mercury Oxide in Seed Treatment

Bulletin No. 668 discusses the use of yellow oxide of mercury for treatment for seed potatoes on Long Island. Experiment Station, Geneva, N. Y., will forward copies.

Use of Amyl Acetate as Grasshopper Bait

Amyl acetate is said to be a satisfactory poison bait for grasshoppers. One of the mixtures is made up of 100 lb. of bran, 5 lb. of salt, 1 quart of sodium arsenite, 2 gals. of blackstrap molasses, and 6 to 8 gals. of water. Materials are mixed thoroughly, and 3 oz. of technical amyl acetate added. Mixture is broadcast over the fields in which the grasshoppers are feeding, or it can be thinly poured into long trenches.

Packaging, Handling and Shipping

British Chemical Makers Comment on Possible Improvements in Large and Small Containers

British *Chemical Age* recently asked 30 of the leading British chemical manufacturers for their comments and criticisms on containers now on the market and for suggestions for ways and means of improving them. Twenty-eight reported they were satisfied with existing ones and but 2 offered suggestions. But, concludes the Journal editorially, "We find it hard to believe that there is so little room for further improvement."

The two letters containing suggestions are of more than passing importance. Number one suggested consideration should be given to:—(a) improvement in the screw caps for drums containing liquids, *e. g.*, the provision of caps which would provide an effective dust protection; (b) the provision of necks for glass bottles, which would be quite uniform internally to facilitate more efficient corking.

Letter two reads in part: "In particular we may note the recent improvement made in wooden containers. From the point of view of both storage and utility the new improved pattern of venesta keg, which has been generally standardized throughout the trade, has proved particularly satisfactory and welcome."

"Our experience of metal containers is less satisfactory. We admit that the standardization of such containers presents certain difficulties in view of the varied nature of the chemicals involved. We have in mind, in particular, the type of drum used for the supply of heavy chemicals, say 50 gal. and upwards. While certain branches of the industry have evolved packages well adapted, from the point of view of utility, to the product concerned, in general there does not appear to have been any effort to produce a package which will satisfy all requirements. For instance, the returnable drums now supplied for the bulk of our heavy chemicals are particularly ill adapted for drawing off small supplies."

"We would strongly recommend that, instead of the screw stopper at present used, necessitating either syphoning off the contents or tilting the drum and pouring into a smaller container, with consequent loss of material at each operation, there should be adopted throughout the trade a standard thread stopper placed in such a position that a tap (also of a standard size) could be inserted and the liquid thereby drawn off. Such a device would be generally welcomed, resulting as it would in considerable saving of material and labor."

"In regard to smaller non-returnable drums, we would draw attention to the practice in many cases of soldering down the aperture, resulting in waste of time when opening, the solder having to be laboriously chipped away, and frequently the chemical becomes contaminated. There is considerable room for improvement in this type of container. A suggestion which occurs to us is a closure consisting of a light metal seal of the 'pull-to-open' type, which could be torn off to expose a lever lid."

"So far as concerns containers used for fine chemicals, we would mention that while much service has been rendered by the makers of tins to meet the exacting requirements of the trade, there is room for still further improvement. We should like, for instance, to see the production of tin containers treated internally so as to obviate the necessity for a special lining, and externally in such a way that a pasted or gummed label will adhere permanently. Further, there is scope for ingenuity in the production of a biscuit-lid tin, the lid of which can be easily secured and yet be pilfer-proof."

All-American Package Competition Opens

The All-American Package Competition for 1936 has been opened and will close on Dec. 19th, with a sharp increase in entries over the 10,000 received last year expected, according to D. E. A. Charlton, editor of *Modern Packaging*, sponsor of the competition. Comprising the board of judges for the competition are: William M. Bristol, Jr., vice president, Bristol-Myers; Vaughn Flannery, art director, Young & Rubicam; George R. Webber, merchandise manager of Standard Brands; Kenneth Collins, vice president of Gimbel Brothers; Charles Luckey Bowman, and Nan M. Collins, account executive of Roland G. E. Ullman Advertising Agency.

Celluloid Issues Booklet on Protectoid

Protectoid Transparent Packaging Material is a new, illustrated booklet published by the Celluloid Corp., 10 E. 40th st., N. Y. City, showing numerous effective applications of this material for packaging a variety of merchandise. The leaflet gives the properties of Protectoid and tells its advantages.

New Angle to Combination Package Idea

A combination package in the automotive specialty field, including a can of Super Solvent radiator cleaner, and Anti Rust, which protects against the formation of rust in the cooling system, is produced by Radiator Specialty Co., Charlotte, N. C. If the dealer pleases, he may sell the 2 cans separately. Idea is applicable to a number of other "Amos and Andy" combinations of chemical specialties.

Rubber Coatings for Soap?

Rubber (a thin coat) may soon be used for wrappers for soap. Coating is easily removed by pulling at a tab on the side. Cakes of soap are sprayed with or dipped into an aqueous solution containing rubber, sulfur, zinc oxide and an ultra-rapid accelerator. Coated with this solution, cakes go into a drying chamber and then into a vulcanizing chamber. J. P. Kane, N. Y. City, is the inventor and has been granted U. S. Patent 2,042,104.

Now Plastics Oil Containers

The plastics may take a hand in the "dog-fight" for the major part of the lubricating oil container business. A molded oil can is being offered in Germany; one advantage is that it can be made transparent, so that the oil level in the can is visible. Another advantage is that the can is offered in a variety of colors and designs, which can be selected for their sales appeal. Spout may be molded from a synthetic resin or it may be made of metal; in either case it is screwed to the can and sealed with a packing ring. This can is made by the Becro Werkzeugfabrik, in Westphalia, Germany. *Kunststoffe*, July, p152.

Selecting the Correct Warehouse

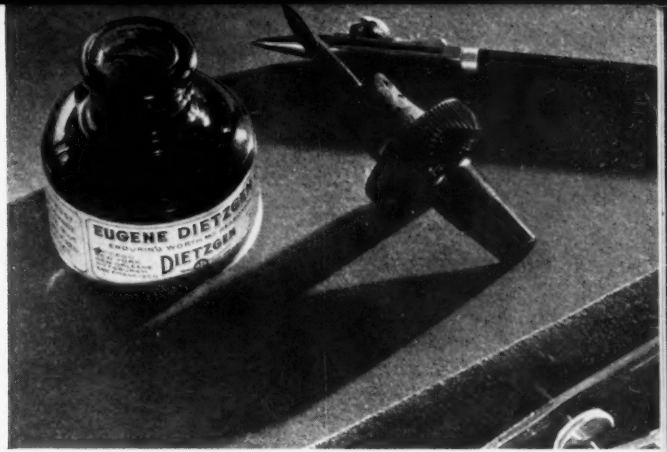
Dr. John H. Frederick outlines in *Shipping Management* for September 5 considerations in the selection of a warehouse from a transportation standpoint: 1. The distance from the factory to the warehouse; 2. Carload freight rates from the factory to warehouse; 3. Less-than-carload freight rate from warehouse to customers, including possibilities of using motor truck service; 4. Less-than-carload freight rate from the factory to customers, also taking into consideration possibilities of using motor truck service; 5. Warehouse charges.

New Products— New Packages

Inexpensive but strong label used by Loraine Latimer, Chicago, for fine furniture polish to be sold by mail. Art work for a label is by Kathleen Fitzgerald, under direction of Brayton, Anderson & Associates, Chicago. Photography by Apex.



Two sprayers are provided with each gallon jug of Windex (Drackett Chemical, Cincinnati) used as a window, windshield cleaner. Sprayer containers are non-breakable and especially adapted for filling station use. Caps on jugs and sprayers are Phoenix ST Caps, made by Phoenix Metal Cap, Chicago. Sprayers manufactured by Federal Tool. *Heetfield-Tillou Photo.*



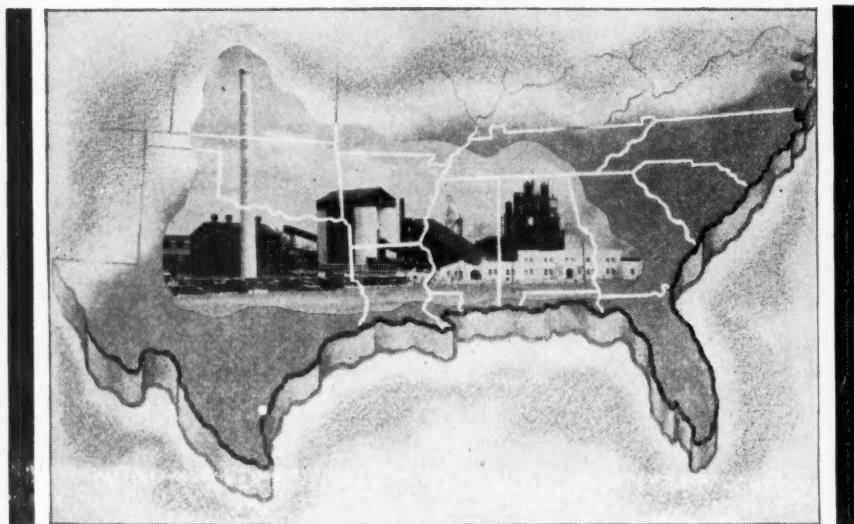
Eugene Dietzgen Co. has improved the caps of its drawing ink by adopting a light, inert, strong, shiny and pleasant-to-handle cap made of Durez (molded by Consolidated). Below, General Electric adopts a new counter display to help merchandise its Glyptal Cement through retail household outlets. Each display holds 12 handy-sized tubes.



Chas. Pfizer & Co., New York City and Chicago (manufacturers of fine and industrial chemicals and pharmaceuticals) has adopted a new packaging line. Word "Pfizer" is embossed on a blue plastic cap matching the attractive label. Chemical inertness, tight seal, moisture resistance, and ease of opening, are claimed for this type of package. Cap is molded of Durez (General Plastics).



EXPANSION



Steadily—for the past two years—Southern Alkali has penetrated further and further throughout the great Southwest market—and even beyond. As the pioneer alkali manufacturer of that territory, it has come to know—and ably serve—the leading industries in that area.

There are good reasons for this expansion. These include highest quality alkalis, quick deliveries, low transportation costs (rail and tide-water), and a Technical Service Department expert in the production and handling problems confronting all alkali users. Why not expand with Southern Alkali?

SODA ASH
CAUSTIC SODA
LIQUID CAUSTIC
MODIFIED SODAS
CAUSTIC ASH

SOUTHERN
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SOUTHERN ALKALI CORPORATION •

30 ROCKEFELLER PLAZA • NEW YORK, N. Y.
SANTA FE TERMINAL BUILDING • DALLAS, TEXAS
CORPUS CHRISTI, TEXAS

New Trade Marks of the Month

282,785



354,894

MAID-BRITE



358,149

SELKO

功成

380,572



366,047



365,400

METAL-TONE

367,630

Colodense

368,300

ORGANO

368,301

TERRE

369,719



371,354

MAPORIZE

372,122

EMPIRE

373,902



375,550



376,326

SULCOLOID

377,068

Nitrazine

377,139

CENCO-SEALSTIX

375,830



376,272

"FEED THE SOIL AND IT WILL FEED YOU"



376,522-3-4



377,227

NALCO

377,265

DURALOY

377,642



376,524. Bohme Fettchemie-Gesellschaft mit Beschränkter Haftung, Chemnitz, Germany; filed Mar. 28, '36; dyes, solvents for rubber; use since Apr. 8, '35.

377,227. National Aluminate Corp., Chicago, Ill.; filed Apr. 15, '36; water softening apparatus; use since Mar. 5, '36.

377,265. Detroit Paper Products Corp., Detroit, Mich.; filed Apr. 16, '36, phenolic impregnated paper; use since Jan. '35.

377,642. New England Alcohol Co., Everett, Mass.; filed Apr. 25, '36; anti-freeze compositions; use since Nov. 6, '35.

Chemical Specialty Patents*

Preparation of a paving composition consisting of broken rock, a liquefier coating the rock pieces, asphalt cement, and a sufficient amount of finely divided ore containing iron oxide. No. 2,051,577. William L. Schloss, Cleveland Heights, Ohio.

Production of a tanning and bleaching composition containing a synthetic tanning agent of the sulfonated diarylmethane type and formic acid. No. 2,051,607. Alphons O. Jaeger, Greentree, Pa., to Cyanamid and Chemical Corp., N. Y. City.

Manufacture of a bar of soap with a grooved outer ridge to protect advertising matter in center of soap from being rubbed out as soon as the soap is used. No. 2,051,625. James Arthur Watt, Chicago.

Production of a paving material made from an aggregate and a bituminous liquid. No. 2,051,731. Kenneth E. McConaughay, Indianapolis, Ind., to Pre Cote Corp., Indianapolis, Ind.

Method of cleaning latent abrasion marks from the surface of silver halide photographic emulsion layers before development including treating the dry emulsion with an atmosphere containing an oxidizing gas. No. 2,051,798.

In tree surgery method of sealing excoriated arboraceous tissues from the atmosphere by application of a high molecular weight polymer of isobutylene. No. 2,051,840. Howard L. Gerhart, Whiting, Ind., to Standard Oil Co., Chicago, Ill.

Production of a waterproof scroop on fibrous materials. No. 2,051,843. Ernst Gotte, Chemnitz, Germany, to American Hyalcol Corp., Wilmington, Del.

Copper fungicides. Water insoluble complex copper-zinc silicate gel composition in which ratio of zinc to copper is at least 1:20 and which is non-injurious to growing vegetation. No. 2,051,910. Alwyn C. Sessions, New Brunswick, N. J., to California Spray-Chemical Corp., Berkeley, Calif.

Process rejuvenating typewriter ribbons: first step being application of the reaction product of a boiled mixture of coconut oil, sulfuric acid, lamp black, and gum arabic. No. 2,051,942. Valentin D. Guzman, Gapan, P. I.

Preparation moistureproofing agent. No. 2,051,944. Albert Hershberger, Kenmore, N. Y., to duPont, Wilmington, Del.

Production wetting, cleansing, and emulsifying agents for animal, vegetable, and artificial fibres. No. 2,051,947. Heinz Hunsdiecker and Egon Vogt, Cologne, Germany.

Method preventing foaming of emulsions. No. 2,052,164. Hym E. Buc, Roselle, N. J., to Standard Oil Development Co., a corporation of Delaware.

Sizing composition; being rosin soap forming composition, comprising abietic acid and an alkaline material. No. 2,052,170. Max Engelmann, Wilmington, Del., to Bayer-Semesan Co., New York City.

Reproducing crayon comprising charcoal, an alum, and glycerol. No. 2,052,266. Hans Wieneke, Thalfang, near Berncastel, Germany.

Manufacture stencil sheets; using coating composition comprising gelatin admixed with Turkey red oil, oleic alcohol, chlorinated naphthalene, and the mono-oleate of glycerol. No. 2,052,291. Bruno Hagg, Goslar-am-Harz, Germany, to Greif-Werke vorm. Deutsche Burobedarfs Gesellschaft Bruer & Co., Goslar-am-Harz, Germany.

Production water soluble and water miscible insecticides. No. 2,052,374. Robert Wotherpoon, East Orange, N. J., to Derris, Inc., New York City.

Sulfonation of oil. No. 2,052,570. Philip

(Specialty Patents continued on next page.)

* Patents covered in this issue include those appearing in the U. S. Patent Gazette, end of August 18 to September 15.

† Trade-marks reproduced and described cover those appearing in the U. S. Patent Gazette, middle week August 25 to September 15.

Trade Mark Descriptions†

282,785. Hygienic Products Co., Canton, Ohio; filed Apr. 22, '29; cleaning powder water closet bowls, automobile radiators; use since Feb. 25, '13, water closet bowls; since Apr. 1, '22, for automobile radiators.

354,894. Dacar Products Co., Canton, Ohio; filed Aug. 11, '34; soap with water softening properties; use since Apr. 3, '34.

358,149. Pacific Trading Co., Inc., San Francisco, Calif.; filed Nov. 12, '34; fertilizer; use since Oct. 6, '34.

380,572. Kutol Products Co., Inc., Cincinnati, Ohio; filed July 3, '36; wall paper cleaner; use since Dec. '33.

366,047. Pan American Petroleum Corp., Wilmington, Del.; filed June 8, '35; lubricating oils; use since May 3, '35.

365,400. Union Oil Co. of California, Los Angeles, Calif.; filed May 25, '35; metal polish; use since Nov. 1, '32.

367,630. Shellmar Products Co., Mt. Vernon, Ohio; filed July 24, '35; wrappers, bags and containers produced from paper or cellulose sheeting; use since Apr. '31.

368,300. MacMullen-Terhune Co., Rochelle Park, N. J.; filed Aug. 14, '35; fertilizer; use since July 30, '30.

368,301. MacMullen-Terhune Co., Rochelle Park, N. J.; filed Aug. 14, '35; fertilizer; use since July 30, '30.

369,719. Standard Oil Co. of New Jersey, Wilmington, Del.; filed Sept. 25, '35; asphalt; use since Aug. 31, '35.

371,354. Mapor Corp., New York City; filed Nov. 8, '35; cleaner for automobiles, floors, walls, furniture, floor-coverings, etc.; use since May 1, '35.

372,122. Wolverine-Empire Refining Co., New York City; filed Nov. 29, '35; for painters' naphtha, paint thinner, turpentine substitute, floor wax, and paint oils; use since '04 on naphtha and thinner; since '09 on waxes, turpentine, floor wax, and oils.

373,902. Clear Sky Coalette Fuel Co., East Peoria and Du Quoin, Ill.; filed Jan. 20, '36; treated coal; use since Nov. 8, '35.

375,550. Benjamin Goldstein (Lafayette Products Co.), Brooklyn, N. Y.; filed Mar. 4, '36; cleaning preparation for hats; use since Jan. 22, '36.

376,326. Ansbacher, Siegle Corp., Brooklyn, N. Y.; filed Mar. 24, '36; agricultural, insecticidal and fungicidal material; use since May 4, '32.

377,068. E. R. Squibb & Sons, New York City; filed Apr. 10, '36; chemical indicators; use since Oct. 26, '33.

377,139. Central Scientific Co., Chicago, Ill.; filed Apr. 13, '36; laboratory cement; use since Mar. 21, '36.

375,830. Frederick A. Seiberling (Fred A. Seiberling Mfg. Co.), Chicago, Ill.; filed Mar. 10, '36; tire fluids for pneumatic tires; use since Aug. 17, '34.

376,272. Fort Smith Cotton Oil Co., Fort Smith, Ark.; filed Mar. 23, '36; fertilizer, cottonseed meal base; use since Jan. 1, '36.

376,522. Bohme Fettchemie-Gesellschaft mit Beschränkter Haftung, Chemnitz, Germany; filed Mar. 28, '36; detergents; use since Apr. 8, '35.

376,523. Bohme Fettchemie-Gesellschaft mit Beschränkter Haftung, Chemnitz, Germany; filed Mar. 28, '36; mineral wax, paraffin, and lubricating greases; use since Apr. 8, '35.

Descriptions (Continued)

Kaplan, Brooklyn, N. Y., to Richards Chemical Works, Inc., Jersey City, N. J.

Solder for aluminum, comprising a tubular solder composed of pure tin and a core of a non-corrosive reaction product of a metal chloride and an organic acid. No. 2,052,740. Clifford L. Barber and Perry C. Ripley to Kester Solder Co., all of Chicago, Ill.

Removal spots from fabrics by working into the spots a water emulsion of a soap composition containing an oil-soluble ethanalamine soap of a higher saturated fatty acid, an ether of ethylene glycol, and a quantity of light petroleum solvent. No. 2,052,891. David R. Merrill, Long Beach, Calif., to Union Oil Co. of Calif., Los Angeles, Calif.

Dry cleaning fluid of the chlorinated solvent type. No. 2,053,007. Geo. L. Parkhurst to Standard Oil Co., both of Chicago, Ill.

Cleaner for lenses; chamois skin having chromium oxide and a hygroscopic agent therein. No. 2,053,475. Louis A. Gredys, Chicago, Ill.

Process for grouting cracks and contraction joints; injecting into such voids a gel in solution, then a grout mixture containing a setting retarder, which mixture possesses great plasticity when first set. No. 2,053,562. Lars R. Jorgenson, Berkeley, Calif.

Compounds for protecting animal fibres from textile pests, corresponding to the formula R-CHX-R; in which R denotes aromatic nuclei, containing at least one halogen atom and an etherified phenolic hydroxyl group, and X denotes hydrogen or an aromatic nucleus, any phenolic hydroxyl groups being etherified by alkyl groups. No. 2,053,610. Theo. Hermann, Frankfurt-Hochst, Robt. Seydel, Cologne-Dellbrück, and Walther Retter, Cologne-Deutz, Germany, to I. G., Frankfurt-am-Main, Germany.

Detergent and polishing compound; a finely comminuted admixture of siliceous materials and normally insoluble metallic sulfides in about the proportion of 7 pts. of the siliceous material to one pt. of the metallic sulfide, by wt. No. 2,053,613. Fred Grant Hunt, Jr., Denver, Colo.

Thermoplastic adhesive and medium for making laminated fabrics; comprising a composite polymer of conjointly polymerized vinyl acetate and vinyl chloride mixed with a simple polymer of vinyl acetate, a small quantity of vat blue, and a solvent. No. 2,053,773. Ralph M. Freyberg, New York City, to Acme Backing Corp., Brooklyn, N. Y.

Process moistureproofing materials; first forming a cloud of wax particles which in end produce, when fluxed, a flexible, transparent moistureproof film which is not greasy. No. 2,053,782. Frank H. Reichel, Fredericksburg, Va., to Sylvania Industrial Corp., New York City.

Production a cellular cement: whipping a protein, an indurating agent, and water into a stiff foam to form gas bubbles, and stirring bubbles into a cement. No. 2,053,842. John A. Rice, Berkeley, Calif., to Bubblestone Co., Pittsburgh, Pa.

Manufacture a lustrous artificial stone veneer; applying to a thin flexible mold having a lustrous surface a self-hardening plastic cement. No. 2,053,858. Chas. B. White, Albany, N. Y.

Preservation green fodder; moistening same with an aqueous solution of a strontz mineral acid and a wetting agent of the naphthalene-sulfonic acid series. No. 2,054,026. Adolf Steindorff, Kaspar Pfaff, and Wilhelm Staudermann, Frankfurt-am-Main-Hochst, and Adolf Johannsen and Fritz Spohn, Ludwigshafen-am-Rhine, Germany, to I. G., Frankfurt-am-Main, Germany.

Seed grain disinfectant having as an active ingredient a hydroxyphenylhydrazine. No. 2,054,062. Wilhelm Bonrath, Leverkusen-I. G. Werk, and Ewald Urbschat, Cologne-Mulheim, Germany, to Winthrop Chemical Company, Inc., New York City.

Inking machine ribbon whose filaments are composed of regenerated cellulose. No. 2,054,091. Wm. W. McElrath, Roanoke, Va., to Cello-Rite Ribbon Corp.

Heat sealing composition comprising paraffin wax and pale crepe rubber, being adapted to form moistureproof, waterproof, non-tacky, elastic and flexible films, which remain flexible at low temperatures. No. 2,054,112. Allen Abrams and Charley L. Wagner, Wausau, Wis., to Marathon Paper Mills, Rothschild, Wis.

Substituted sulfonic acids of high wetting, dispersing, and emulsifying power; condensing a terpene with an aromatic compound of the benzene and naphthalene series, sulfonating and condensing the reaction product with an aldehyde capable of forming a bridge linking together several aromatic nuclei. No. 2,054,140. Ernest Seessmann, Newark, N. J., to National Oil Products Co., Harrison, N. J.

Preparation colored granules of mineral matter for use on composition roofing, which includes applying to the granules a coat for sealing the surface of each granule. No. 2,054,317. Henry R. Gundlach, Balto., Md., to Central Commercial Co., a corporation of Illinois.

Specialty Patents concluded on next page.

378,030

VISPRONAL

378,457



378,728



378,857

BEE-NU

378,877

SILLMENT

378,892

CLEARTEX

378,896



378,908



379,066

dag

379,785

PUMPCRETE

379,156

flexo

379,184

EX SECT

379,205

SEAL

379,212



379,224

AMIGLAZE

379,551

dri-O-Dine

379,563



379,615

HUMBLE

379,634-5

PATEX

379,735

PERMALAWN

379,762

IRONSET

379,774

SHOE PRESS

379,849

ANTMORG

379,897



379,885

TRIPLE LIFE

379,891

INSUMENT

379,899



379,965

GLEN ROSE

Descriptions

378,030. Advance Solvents & Chemical Corp., New York City; filed May 5, '36; synthetic polymerization products; use since Feb. 5, '36.

378,457. Standard Mailing Machines Co., Everett, Mass.; filed May 14, '36; duplicating fluid; use since Dec. 30, '31.

378,728. Frieda Martin (Leader Blue Co.), College Point, L. I., N. Y.; filed May 21, '36; laundry bluing; use since Apr. 1, '35.

378,857. Wm. F. Ritter (Bee-Nu Products Co.), New Hartford, N. Y.; filed May 25, '36; enamel; use since Mar. 8, '36.

378,877. Champion Spark Plug Co., Toledo, Ohio; filed May 26, '36; fine mineral powders so compacted by pressure that the particles interlock; use since Apr. 25, '36.

378,892. Kenneth S. Rupp (Cleartex Co.), Oakland, Calif.; filed Jan. 20, '36; cleanser and polish for glass, windshields, etc.; use since Nov. 25, '35.

378,896. Motow Trading Co., Inc., New York City; filed May 26, '36; petroleum oils or admixed with animal or vegetable substances, use since May 4, '36.

378,908. Standard Mailing Machines Co., Everett, Mass.; filed May 26, '36; duplicating fluid; use since Mar. 6, '36.

379,066. Acheson Colloids Corp., Port Huron, Mich.; filed June 1, '36; organic or inorganic substances in a colloidal, fine particle state; use since June 30, '10.

379,785. Chain Belt Co., Milwaukee, Wis.; filed June 16, '36; packing and lubricating compounds for plastic-concrete handling valves; use since Apr. '35.

379,156. Swift & Co., Chicago, Ill.; filed June 1, '36; water softener and soap saver; use since Apr. 27, '36.

379,184. The Bordman Co., Philadelphia, Pa.; filed June 2, '36; insecticides; use since May 1, '35.

379,205. Philadelphia Quartz Co., Philadelphia, Pa.; filed June 2, '36; silicate of soda, for adhesive purposes; use since May 14, '36.

379,212. Royce Chemical Co., Carlton Hill, N. J.; filed June 2, '36; chemicals for dyeing, bleaching, finishing, and treatment of textiles, and for stripping and discharging dyed fibers and fabrics; use since Jan. 26, '35.

379,224. Amiglaze Co., Inc., New York City; filed June 3, '36; cellulose finishing compound for wood, metal, marble, linoleum, etc.; use since Nov. 3, '34.

379,551. Driodine Corp., Los Angeles, Calif.; filed June 11, '36; iodine preparation in powder form, antiseptic and germicide; use since May 8, '36.

379,563. Northam Warren Corp., New York City; filed June 11, '36; soap; use since Dec. 28, '17.

379,615. Humble Oil & Refining Co., Houston, Texas; filed June 12, '36; petroleum oils or admixed with animal or vegetable substances; use since Feb. 18, '36.

379,634. Patek & Company, San Francisco, Calif.; filed June 12, '36; detergents, soaps, saponified oils, dry cleaning, leather preparations; claims first use Jan. '23.

379,635. Patek & Co., San Francisco, Calif.; filed June 12, '36; for laundry chemicals; use since July 16 in bluing; since Jan. '20 on laundry starches and alkalies; since Mar. '27 on bleaches; since June '29 on dyes; since Sept. '29 on sizes for textiles; since May '30 on preparations used to neutralize alkalinity of washed goods and to sour washed goods.

379,735. Caldwell Seed Company, Evanston, Ill.; filed June 15, '36; fertilizers; use since Apr. 10, '35.

379,762. Plibrico Jointless Firebrick Co. (Fireline Stove & Furnace Lining Co.), Chicago, Ill.; filed June 15, '36; asbestos furnace and retort cement; use since Apr. 14, '36.

379,941

LO-EX 70

379,960

LINO-MIX

380,004

ZEROSEAL

380,005

ZEROTEX

380,006

ZEROTAPE

380,015

EVEREADY

380,034

CUSHION KING

380,087

WYT-S-SNO

380,088

AUTOHOL

380,102

SYNTHELACQ

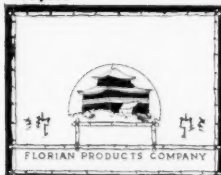
380,128

BAROSA

380,154

MERCOLAN

380,209



380,233

ALCOBUTATE

380,224

AGATE

380,220

NAFRA

380,230

ALCOSAM

380,231

ALCOSAMATE

380,232

ALCOBUTE

380,234

ALCOHEXOL

380,235

ALCOHEXATE

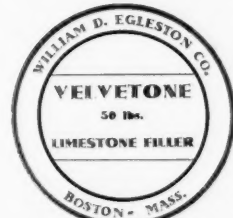
380,236

KETOMET

380,237

KETOBUTE

380,266



380,248

DEEP-LITE

380,315

NEOCOTON

380,316

NEOSOL

380,298



380,340

PROTECTOID

380,341

PROTECTOID

380,372

FILPOR

380,380



380,385

Nor'zone

380,471

COP-PRO-TEX

380,414

S. B. S. No. 11

380,510

ZEPHYR

380,480



380,513

HOT-FOOT**Descriptions**

379,774. Shoe Press Corp., Philadelphia, Pa.; filed June 15, '36; stitching wax; use since May 13, '36.

379,849. Northfield Specialty Co., Inc., Northfield, N. J.; filed June 17, '36; insecticide; use since May, '36.

379,887. Extreme Pressure Oil Corp., Indianapolis, Ind.; filed June 18, '36; lubricating oils; use since Jan. 1, '36.

379,888. Franklin Research Co., Philadelphia, Pa.; filed June 18, '36; coatings providing protective film on painted, enameled, varnished or lacquered surfaces, and for keeping polished metal surfaces bright; use since May 16, '35.

379,891. Laclede-Christy Clay Products Co., St. Louis, Mo.; filed June 18, '36; masonry cement; use since June 6, '36.

379,899. Philadelphia Quartz Co., Philadelphia, Pa.; filed June 18, '36; silicate of soda; use since June 2, '36.

379,965. The Leonard Co., Chicago, Ill.; filed June 19, '36; motor oils, gasoline; use since June 5, '36.

379,941. Aluminum Company of America, Pittsburgh, Pa.; filed June 19, '36; aluminum alloys; use since May 23, '36.

379,960. Hall Hardware Co., Minneapolis, Minn.; filed June 19, '36; varnish; use since Feb. 1, '34.

380,004. Johns-Manville Corp., New York City; filed June 20, '36; plastic bituminous coating; use since Jan. 7, '36.

380,005. Johns-Manville Corp., New York City; filed June 20, '36; thermal insulating material; use since Mar. 20, '36.

380,006. Johns-Manville Corp., New York City; filed June 20, '36; friction binder for thermal insulation; use since Mar. 20, '36.

380,015. National Carbon Co., Inc., New York City; filed June 20, '36; conditioning and cleaning compositions for cooling systems; use since Mar. 2, '36.

380,034. Chicago Hydraulic Oil Co., Chicago, Ill.; filed June 22, '36; brake fluid; use since Apr. 20, '35.

380,087. S. S. Stafford, Inc., New York City; filed June 22, '36; shoe cleaner; use since Jan. 24, '36.

380,088. Standard Alcohol Co., Wilmington, Del.; filed June 22, '36; anti-freeze; use since May 8, '36.

380,102. Glidden Co., Cleveland, Ohio; filed June 23, '36; paints, lacquers, and enamels; use since June 6, '36.

380,128. Standard Oil Co. of New Jersey, Wilmington, Del.; filed June 23, '36; lubricating oils; use since May 21, '36.

380,154. Merchants Chemical Co., Inc., New York City; filed June 24, '36; compound for mothproofing fabrics; use since June 7, '36.

380,209. F. A. Lifter (Florian Products Co.), Newark, N. J.; filed June 25, '36; paints, enamel, varnishes; use since May 15, '36.

380,233. Standard Alcohol Co., Wilmington, Del.; filed June 25, '36; for hydrocarbon derivative solvents; use since May 8, '36.

380,224. Procter & Gamble Co., Cincinnati, Ohio; filed June 25, '36; stearic acid; use since June 9, '36.

380,220. Nafra Products, Inc., Dallas, Texas; filed June 25, '36; cleaner for rugs and upholstery; use since Apr. 24, '36.

380,230. Standard Alcohol Co., Wilmington, Del.; filed June 25, '36; for hydrocarbon derivative solvents; use since May 8, '36.

380,231. Standard Alcohol Co., Wilmington, Del.; filed June 25, '36; for hydrocarbon derivative solvents; use since May 8, '36.

380,232. Standard Alcohol Co., Wilmington, Del.; filed June 25, '36; hydrocarbon derivative solvents; use since May 8, '36.

380,234. Standard Alcohol Co., Wilmington, Del.; filed June 25, '36; for hydrocarbon derivative solvents; use since May 8, '36.

380,235. Standard Alcohol Co., Wilmington, Del.; filed June 25, '36; for hydrocarbon derivative solvents; use since May 8, '36.

380,236. Standard Alcohol Co., Wilmington, Del.; filed June 25, '36; for hydrocarbon derivative solvents; use since May 8, '36.

380,237. Standard Alcohol Co., Wilmington, Del.; filed June 25, '36; for hydrocarbon derivative solvents; use since May 8, '36.

380,265. Wm. D. Eggleston (Wm. D. Eggleston Co.), Boston, Mass.; filed June 26, '36; limestone filler; use since June 15, '36.

380,248. Devco & Reynolds Co., Inc., New York City; filed June 25, '36; marine paints; use since Oct. 7, '35.

380,315. Society of Chemical Industry in Basle, Basel, Switzerland; filed June 26, '36; coal-tar colors; use since Oct. 6, '27.

380,316. Society of Chemical Industry in Basle, Basel, Switzerland; filed June 26, '36; coal-tar colors; use since June 10, '36.

380,298. Ohio Grease Co., Loudonville, Ohio; filed June 26, '36; lubricating oils and greases; use since June 6, '36.

380,340. Celluloid Corp., Newark, N. J.; filed June 27, '36; plastic material, sheets, foils, films, rods, or tubes; use since Apr. 1, '26.

380,341. Celluloid Corp., Newark, N. J.; filed June 27, '36; articles made from plastics; use since Feb. 9, '33.

380,372. West Disinfecting Co., Long Island City, N. Y.; filed June 27, '36; paint or varnish preservative for all kinds of floors; use since June 2, '36.

380,380. John N. Ballard (Ballard Oil Co.), Hillsboro, Texas; filed June 29, '36; gasoline; use since Mar. 1, '36.

380,385. Commercial Solvents Corp., New York City; filed June 29, '36; methanol and radiator anti-freeze solutions; use since June 12, '36.

380,471. Copper Protected Roofing Co., Inc., Orlando, Florida; filed July 1, '36; metal surface sheathing; use since May 21, '36.

380,414. Sugar Beet Products Co., Saginaw, Mich.; filed June 29, '36; hand soap; use since Dec. 4, '35.

380,510. Goodyear Tire & Rubber Co., Akron, Ohio; filed July 2, '36; cold patching cement; use since June 23, '26.

380,480. Norton Co., Worcester, Mass.; filed July 1, '36; abrasives; use since Aug. '32.

380,513. Hot Foot Chemical Co., Birmingham, Ala.; filed July 2, '36; insecticides; use since Oct. 1, '32.

380,527. Pennsylvania Salt Mfg. Co., Philadelphia, Pa.; filed July 2, '36; dry alkaline detergent; use since June 23, '36.

380,571. It Shoe Polish Co., Inc., Baltimore, Md.; filed July 3, '36; shoe cleaner and polisher; use since Jan. 30, '36.

Specialty Patents (Concluded)

Protecting whole fruit and vegetables from decay by contacting them with an aqueous solution containing a water-soluble salt of hydroxy diphenyl, and an alkali. No. 2,054,392. Jagan N. Sharma, Riverside, Calif., to Food Machinery Corp., a corporation of Del.

Wood preservation; injecting water and a preserving oil containing phosphatide into wood in such quantities that the ratio of the retained moisture above the fiber saturation point of the wood and the preserving oil is approx. as 2 is to 3. No. 2,054,399. Robt. H. White, Jr., and Jos. A. Vaughan to Industrial Research Corp., all of Atlanta, Ga.

Process treating timber products; by introducing a phosphatide in conjunction with a wood preserving oil into the wood. No. 2,054,400. Robt. H. White, Jr., and Jos. A. Vaughan, to Industrial Research Corp., all of Atlanta, Ga.

Insecticide and deodorizing volatile pad. No. 2,054,434. Fred H. Mayer, Portland, Ore.

Application of adhesive compositions to flexible sheet material. No. 2,054,448. Frank H. Russell, Needham, Mass., one-half to Dewey & Almy Chemical Co., No. Cambridge, Mass., and one-half to Pepperell Mfg. Co., Boston, Mass.

Method for destruction of weeds and for the improvement of crops. No. 2,054,509. Isaac Pastac, Versailles, France.

Peat loam is being scraped and processed for fertilizer use by Manito Chemical, Manito, Ill. Raw peat is carried from bog to plant by narrow gauge railway.

Ken R. Dyke, former Colgate-Palmolive-Peet advertising manager is in the Far East.

380,52

VITEX

380,571

SPORTEX

380,599

MULBINDER

388,402



380,603

UNITED
ROACH
TABLETS

380,548

Lignum

380,727

EBSACO

380,793

CALICO

380,854

PARALITH

380,857

DUB-BEL-IFE

380,899

APCOL

380,900

GELODYN

380,967

PRO-(SO)-TEX

380,968

SEIR-(O)-TEX

380,924



380,944



380,980

PROOFTEX

381,002

MOTHAIRE

381,050



381,064

COBLIN

381,090

LIMALL

381,126

LTZ

381,125

KOLDPRUF

381,241



381,295



381,300

QUICKSAND

381,301

4 - 4 - 1

381,437



381,551

BETHCOLITE

381,619

CLARAY

381,819



381,437. Valentine & Co., New York City; filed July 24, '36; paints, enamels, aluminum and bronze paints, primers, fillers, varnishes, and anti-fouling compounds; use since Jan. 14, '35.

381,551. Bethlehem Steel Co., Bethlehem, Pa.; filed July 29, '36; cold-reduced tin plate; use since July 9, '36.

381,619. International Printing Ink Corp.; New York City; filed July 30, '36; coating lacquers, thinners, dispersed pigments; use since July 17, '36.

381,819. Royce Chemical Co., Carlton Hill, N. J.; filed Aug. 4, '36; general cleaning and scouring compound; use since July 21, '36.

Prize for Cotton Worm Control

The Royal Agricultural Society of Egypt has offered a prize of approximately \$100,000 to the discoverer of the best method of exterminating the cotton worm which causes serious damage to the Egyptian crop. Competition is open to foreigners as well as Egyptians, though competitors should be members of recognized scientific bodies. Each method considered worthy by the Society will be tried for 6 years, after which the award will be made.

Carman Declares Dividend

A dividend of 50c on account of accumulations on the Class A stock was declared recently by Carman & Co. On June 1, 50c was paid against arrearages.

DuPont Changes Trade Names

A change in the name of Brilliant Aviol to Avitex is announced by the Organic Chemicals Dept. of du Pont. Change is in the name only, product being the same line of finishing agents derived from higher fatty alcohols. Avitex has been adopted to distinguish the du Pont finishing agents from other types under the Aviol name. New names corresponding to the old are: Avitex SF, formerly Brilliant Aviol L-142; Avitex AD, formerly Brilliant Aviol L-144; Avitex W, formerly Brilliant Aviol L-168; Avitex C, formerly Brilliant Aviol L-200.

Plan Larger Perilla Supplies

With an eye to the large and growing market in the U. S. for perilla oil, a drying agent now being used extensively by manufacturers of paint products, the Manchurian Government plans to extend its perilla seed crop to approximately 600,000 tons per annum during the next 5 years, according to cable reports reaching C. C. Concannon, Chief of the Commerce Dept.'s Chemical Division. Approximately one-half million acres were sown to perilla in Manchuria this spring and the yield in seed is expected to be between 300 and 360 million lbs. with some local opinion that it will run as high as 400 million, a recent cable from Shanghai states.

Descriptions

380,599. Texas Co., New York City; filed July 3, '36; residual petroleum, viz. asphalt; use since June 22, '36.

388,402. Kutol Products Co., Cincinnati, Ohio; filed Nov. 19, '34; for wallpaper cleaner; use since Dec. 1, '33.

380,603. United Sanitary Chemical Co., Inc., Baltimore, Md.; filed July 3, '36; roaches, bugs, and vermin exterminator; use since May 3, '33.

380,648. Lignum Chemical Works, Brooklyn, N. Y.; filed July 6, '36; granulated and processed wood floors and sawdust; use since 1886.

380,727. Eugene Teitlebaum (Ebsa Co.), New York City; filed July 7, '36; preservatives for textiles; use since Oct. '35.

380,793. Procter & Gamble Co., Cincinnati, Ohio; filed July 8, '36; soap; use since May 12, '36.

380,854. Agfa Ansco Corp., Binghamton, N. Y.; filed July 10, '36; photographic chemicals; use since May 29, '36.

380,857. Walter W. Ames, So. Orange, N. J.; filed July 10, '36; oil preparation for preserving, treating, and lubricating belts; use since June 29, '36.

380,899. Atlas Powder Company, Wilmington, Del.; filed July 11, '36; explosives; use since Mar. 31, '34.

380,900. Atlas Powder Company, Wilmington, Del.; filed July 11, '36; explosives; use since Jan. 31, '36.

380,967. Quaker Chemical Products Corp., Conshohocken, Pa.; filed July 13, '36; chemical preparations of salts, pigments, and oleaginous materials for use in finishing textiles; use since June 16, '36.

380,968. Quaker Chemical Products Corp., Conshohocken, Pa.; filed July 13, '36; oleaginous preparation for use as a soaking medium in softening, scouring, and lubricating textile fibers; use since June 16, '36.

380,924. Royce Chemical Co., Carlton Hill, N. J.; filed July 11, '36; household and personal cleaners; use since July 1, '36.

380,944. Chas. Charcowsky, Inc., New York City; filed July 13, '36; varnishes; use since May 1, '36.

380,980. Howard C. Wirick (Proofex Labs.), Chicago, Ill.; filed July 13, '36; preservative laundered finish of fabrics; use since June 1, '33.

381,002. Odora Company, Inc., New York City; filed July 14, '36; deodorizer, insect repellent, and sprays; use since June 29, '36.

381,050. Sapolin Co., Inc., New York City; filed July 15, '36; paints, enamels, varnishes, stains, furniture polish; polishing wax, bronzing liquids, bronze powder, and metallic paints; use since July 9, '36.

381,064. Clarence M. Cobb, Boston, Mass.; filed July 16, '36; chemical preparation for finishing textiles during manufacture, laundering, or dry cleaning; use since Apr. '35.

381,090. Solebury Agricultural Lime Co., New Hope, Pa.; filed July 16, '36; combined magnesium and calcium used for fertilizers; use since Apr. 1, '34.

381,126. General Paint & Varnish Co., Chicago, Ill.; filed July 17, '36; paint, varnishes, stains, enamels; use since January '32.

381,125. Empire Oil & Refining Co., Bartlesville, Okla.; filed July 17, '36; anti-freeze preparation; use since July 3, '36.

381,241. West Coast Soap Co., Oakland, Calif.; filed July 20, '36; soap powder; use since Jan. '31.

381,295. Valentine & Co., New York City; filed July 21, '36; paint; use since Apr. 11, '36.

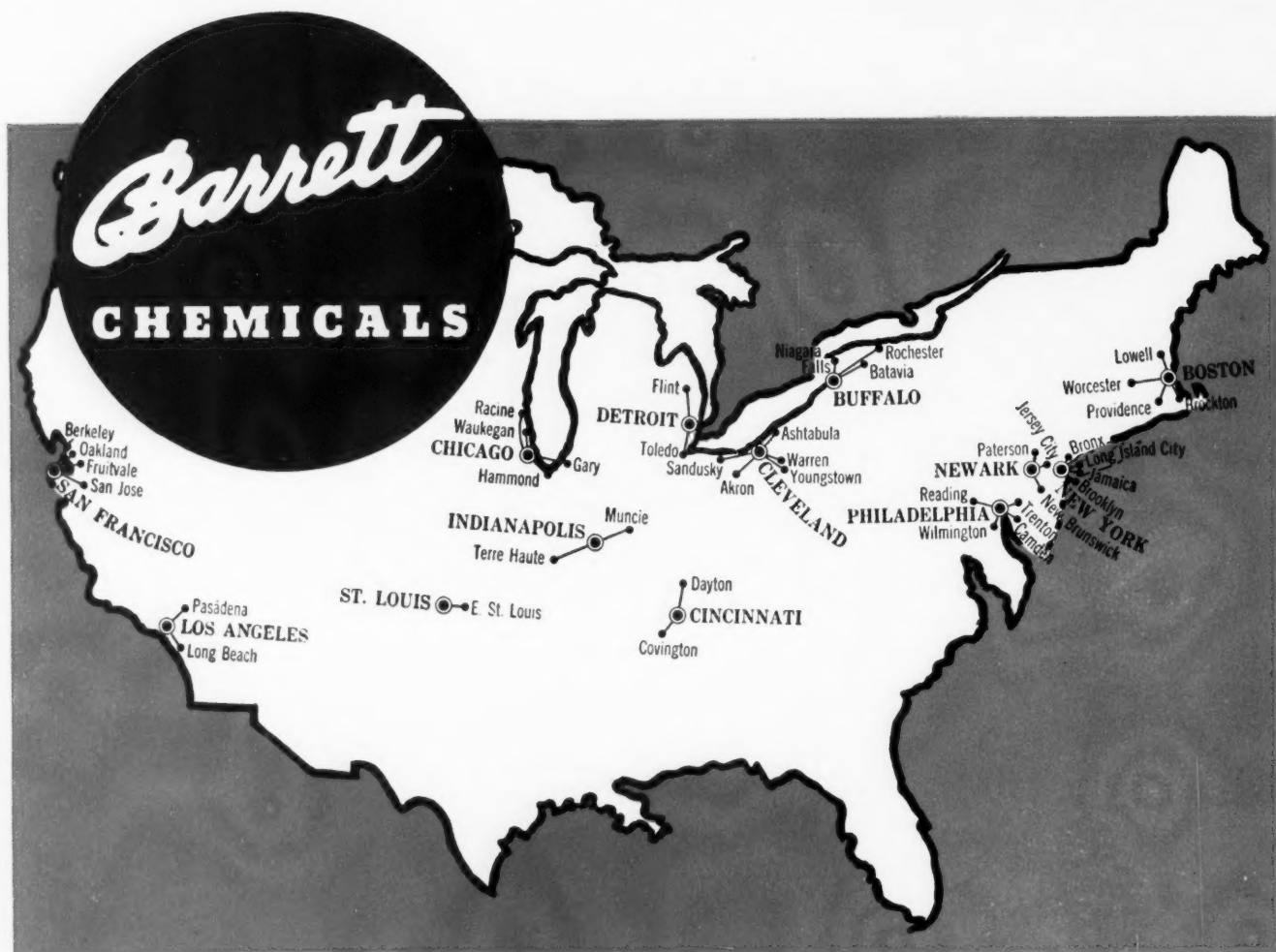
381,300. Valentine & Co., New York City; filed July 21, '36; lacquer primer surfacer; use since Jan. 3, '36.

381,301. Valentine & Co., New York City; filed July 21, '36; lacquer; use since May 27, '35.

CHEMICAL NEWS & MARKETS



Lee A. Keane
New general sales manager,
U. S. Industrial Alcohol Co.



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ANHYDROUS AMMONIA	PHENOL (Natural)
AMMONIA LIQUOR	U. S. P., 39.5° M. Pt. and 40° M. Pt.
BARRETAN*	Technical 39° M. Pt. Technical 82-84% and 90-92%
BENZOL Pure and 90%	PICKLING INHIBITORS
CHLOR META XYLENOL	PICOLINES
CRESOLS	PYRIDINE
U. S. P., Refined Ortho, Meta and Para Special Fractions	Refined, Denaturing and Commercial
CRESYLIC ACID Straw Color and Dark	QUINOLINES
CUMAR*	RUBBER SOFTENERS
Paracoumarone-indene Resin	SHINGLE STAIN OIL
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	TOLUOL
	XYLENOLS
	XYLOL
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SULFUR COMPANIES FIGHT NEW TAX

Favorable Position of American Producers Jeopardized by Prohibitive State Levies and Technological Developments—Chemurgic Council Disputes American Consul's Adverse Report on Alcohol Blends in Germany—Quotes Bergius as Authority—

Production tax of \$2 a ton on sulfur recently imposed by Louisiana (a raise from 60c) has not been paid by sulfur companies operating in that state and they will contest in the courts, it was stated in Austin, Texas, by L. Mims of Houston, vice president of Freeport Sulphur, according to newspaper reports. Since the tax was levied that company has laid off 100 men and reduced production of its Louisiana mines 60%, he is said to have stated.

Recent suggestion of Governor James V. Allred that the Texas legislature, which convened Sept. 28th in special session, increase the sulfur production tax from 75c to the Louisiana levy, will be followed by the introduction of bills carrying out the recommendation soon after the session opens.

One immediate effect of the Louisiana tax was the shifting of operations by Jefferson Lake Oil Co. to Texas. President John Vaccaro stated his company had acquired leases on the Clemons Mound in Brazoria county, Tex., and would immediately start moving its mining equipment from the Lake Peigneur deposits near New Iberia, La.

Of the 2 larger producers, Texas Gulf Sulphur and Freeport Texas, the latter is the more seriously affected at the moment for the most recent deposit of that company is located in Louisiana at Grande Ecaille.

Increase in the Louisiana rate and the threat of an increase in the Texas tax rate comes at a time when the U. S. sulfur industry is being threatened with a loss of sizable export tonnages, the result of the technological advancement in various methods of sulfur recovery as a by-product of metallurgical operations.

Foreign Technical Developments

A new company, Sulphur Patents, Ltd., is being formed by I. C. I., and Bolidens Gruvaktiebolag, Sweden, for the joint exploitation of the processes developed by the 2 companies for the manufacture of sulfur and liquid sulfur dioxide from the sulfurous gases evolved in metallurgical operations such as the roasting and smelting of sulfide ores.

Processes of the 2 companies, points out an official statement issued by I. C. I., are essentially different, but together cover such a wide field of application that there are very few problems, connected with the disposal of sulfurous gases, which cannot be solved technically in a satisfactory manner by one or other

of the processes. Processes controlled by Sulphur Patents, Ltd., also offer a means for the production of elemental sulfur or liquid sulfur dioxide from pyrites or similar materials.

Commenting editorially *Chemical Trade Journal* (British) states: "Announcement of the arrangement made between Imperial Chemical Industries and Boliden Mining of Sweden for the joint exploitation of their respective patented processes for the recovery of sulfur dioxide and sulfur from metallurgical smelter gases draws attention to the great amount of research that has been carried out on this subject during the past 10 years and in all parts of the world. Incentive to this work has been manifold. With the world's workable reserves of native sulfur localized in the U. S. and Italy, and to a lesser extent, in Japan, Chile and Palestine, urge to at least partial independence in brimstone supplies, essential both in peace and war, has been a strong one in many countries. Then there is the necessity of freeing metallurgical gases from sulfur fumes harmful both to public health and to growing vegetation. Again with the sulfuric acid industry relying more nowadays upon brimstone, spent oxide, anhydrite and the waste gases of the metallurgical smelting industries for its raw materials, the pyrites producing countries have found it policy to market a substantial proportion of their output in the form of recovered elemental sulfur. Finally, demand for sulfur for purposes other than acid making is a steadily growing one. Sulfur dioxide, on its part, is a material which is showing signs of still wider industrial application in the future, particularly as a solvent, not only in mineral oil refining but in several branches of organic chemical manufacture."

German Fuel Blends

Alcohol as motor fuel is rapidly losing favor in Germany due, it is said locally, to its high cost, reported inefficiency, and to the fact that other domestic sources are now yielding large quantities of synthetic motor fuels, according to reports from Consul Sydney B. Redecker, Frankfort-on-Main.

Increasing and compulsory use of methanol, coupled with the heavier output of synthetic gasoline, growing shortage of animal feedstuffs and other factors indicate a steady decline in the importance of ethyl alcohol as a motor fuel constituent with the prospects that its compulsory use

may be abandoned altogether at some time in the future, Consul reports.

Prior to January 1st of this year all light motor fuels consumed in Germany were required to contain 10% ethyl alcohol. On that date an official decree decreased required ratio to 9% and on June 1st it was reduced further to 8%, while both measures as well as another of Aug. 1st provide for increased use of methanol motor fuel.

Sharp Retort from Chemurgic Council

This routine report of the American consul, stationed at Frankfurt, the German I. G. headquarters, immediately brought the publicity dept. of the Farm Chemurgic Council into double-quick action. An interview was sought with Dr. Friedrich Bergius, noted German chemist now visiting various sections of the U. S., following his addresses before the A. C. S. in Pittsburgh and the Tercentenary Celebration at Harvard.

Dr. Bergius denied, according to the publicity release of the Council, that alcohol as a motor fuel is not popular with the German public. "Such a statement," he said, "unfortunately is based on misinformation. The only reason for any decrease in the percentage of alcohol blend is due to the lack of adequate volume of certain surplus potatoes or of other starch and sugar crops for this purpose. If we had a surplus harvest in Germany, such as you have in the U. S., it is not at all unlikely that our alcohol blend could and would be increased to 20 or 25%."

Dr. Bergius also denied that there is any decline in Germany in the importance of ethyl alcohol as a motor fuel constituent. He explained the situation as follows:

"Germany is far from decadent; on the other hand, she is a most virile nation. As her population steadily increases, the demand for foodstuffs must increase proportionately. Likewise in my country, necessarily, there has been an increase in livestock breeding, which in turn has increased the demand for livestock feed.

"Thus, as a defensive measure, which every European understands who faces the facts as they really exist, Germany, like other countries, has been compelled to adopt the policy of producing domestically as large an amount as is possible of her requirements of foodstuffs for human beings and of foodstuffs for animals.

"These 2 requirements must be taken care of before motor fuel receives consideration. Hence, the increased domestic demand has made it imperative that a larger volume of German-produced starch and sugar crops should be used for normal purposes, thus leaving, at present, a lesser volume available for the production of alcohol for motor fuel use.

"Another factor involved springs from the difficulties that now attend all foreign trade—fluctuations in exchange; quotas; barriers; and other impediments to the orderly exchange of goods between nations, such as prevailed in the half-century ending in 1914. These obstructions to trade cannot be removed by edict and will take long, patient effort to clear the path for increase in international trade. In this period of transition, during which strong nationalistic policies are imperative, it is primarily essential that one should seek the 3 prime requisites of life—food, shelter and raiment—from Nature's gifts close at hand. This is precisely what we are doing in Germany."

Dr. Bergius was asked whether or not the hydrogenation of coal for the production of synthetic gasoline was not also interfering with the production of alcohol from farm products for motor fuel. Dr. Bergius replied:

"The production of synthetic gasoline in Germany is steadily progressing but this does not interfere with the use of alcohol-blended fuel, by reason of the pronouncedly advancing demand for motor fuel in general.

"On the contrary, a proper blend of ethyl alcohol, methyl alcohol, benzene and gasoline, which the chemist knows how to make with complete certainty, bears promise of supplying the world with the ideal motor fuel which will result in increased efficiency of internal combustion engines, eliminate many aggravating motor troubles, such as pre-detonation, carbonization, etc., but best of all, reduce the dangerous carbon monoxide content of the exhaust gases to the vanishing point insofar as any harm to human beings residing in congested areas is concerned."

First Production by Bailor

While the controversy over the merits of gasoline-alcohol fuel blends reached a rather acute stage in the past month actual production of 1,000 gals. at the Bailor Manufacturing Co. plant at Atchison, Kans., on Sept. 21st was also reported. According to officials of the company, daily production will be up to 3,000 gals. by the 1st week in October.

August Chemical Sales Up 5.2%

Sales by 42 chemical and allied products firms reporting to the Bureau of Foreign and Domestic Commerce and the National Association of Credit Men for August shows a decline of 2.1% from the August '35 figure, but an increase of 5.2% over July '36. Paints and varnishes (20 firms) showed an increase of 14.8% over a year ago and 2.7% increase over July of the current year.

TVA Seeks Phosphate Deposits

TVA is said to be actively prospecting for new phosphate deposits in Tennessee.

July Chemical Exports up 16½%; Imports 40% Higher

U. S. Sells \$88,612,000 Worth of Chemicals Abroad in 1st 7 Months of this Year—American Territorial Areas Take \$1,000,000 Each Month—German Dye Trade Gains—Japan to Make Salt for Ash Production from Sea Water—

Chemical exports continued at high levels in July, exceeding shipments of the preceding month by 5% and were 16½% higher than the value recorded for July last year. During the 1st 7 months the U. S. has sold chemical products to foreign countries valued at \$88,612,000, which compares with \$73,822,000 for the corresponding period of '35, and \$55,400,000 in the 1st 7 months of '33.

Practically all leading items on the chemical export list registered substantial gains in July during which shipments aggregated \$13,011,000 in value. Compared with July of last year, advances made in exports of naval stores, medicinal, chemical specialties, and fertilizers were especially noteworthy, analysis shows.

Exports of industrial chemicals and chemical specialties reached the high total of \$3,655,000 in July, against shipments of such products valued at \$3,116,000 for July, '35—a value increase of around 17½%.

Imports were maintained at peak levels in July with Oriental drying oils continuing to feature the list. As in preceding months more than three-quarters of our imports of such products were made up

of crude and processed materials destined for industrial consumption.

Total value of our imports aggregated \$12,481,000 in July showing little change from the record of the preceding month but were 40% higher than in July last year, during which the total value reached \$8,906,000.

Heavy Trade with Territories

American territorial areas are important consumers of mainland chemical products taking more than one million dollars worth of such commodities each month, according to C. C. Concannon, chief of the Commerce Dept.'s Chemical Division. Total shipments of chemicals and related products from continental U. S. to Hawaii, Puerto Rico, and Alaska aggregated \$12,160,000 during the 12 months ending with June, '36, compared with \$10,548,000 during the '34-'35 fiscal period—a value increase of around 15½%, preliminary statistics reveal. Each of the Territories increased its purchases of such products during the past year. Compared with '34-'35 Hawaii's purchases increased from \$4,747,000 to \$5,426,600; Puerto Rico's from \$4,785,700 to \$5,558,-

COMING EVENTS

National Dairy Association, Dallas, Texas, Oct. 10-18. Lloyd Burlingham, 1508 Chicago Mercantile Exchange Bldg., Chicago.
National Association of Lubricating Grease Manufacturers, Stevens Hotel, Chicago, Oct. 12-13.
Tanners' Council Fall Meeting, Palmer House, Chicago, Oct. 14-15.
Pennsylvania Water Works Association, Hotel Haddon Hall, Atlantic City, Oct. 14-16.
Southern Chemurgic Conference, Lafayette, La., Oct. 15.
American Institute of Mining & Metallurgical Engineers, Statler, Cleveland, Oct. 19-23.
National Metal Congress and Exposition, Cleveland, Oct. 19-23.
Gulf Coast Chemurgic Conference and National Tung-Oil Meeting, San Carlos Hotel, Pensacola, Fla., Oct. 20-21.
American Public Health Association, New Orleans, La., Oct. 20-23.
New York Section, American Water Works Association, Fall Meeting, Saratoga Springs, R. K. Blanchard, 50 W. 50th st., N. Y. City, Oct. 22-23.
N. J. Water Works Association, Hotel Ambassador, Atlantic City, Oct. 23-24.
National Association of Exterminators & Fumigators, Annual Convention, Cleveland, Oct. 26-28.
National Hotel Exposition, Grand Central Palace, N. Y. City, Oct. 26-30.
Oil Trades Association of N. Y., Annual Banquet, Waldorf, N. Y. City, Oct. 27.
National Oil Marketers Association, Annual Convention and Trade Exhibit, Stevens Hotel, Chicago, Oct. 27-29.
American Gas Association Convention, Atlantic City, N. J., week of Oct. 26.
American Petroleum Institute, Annual Meeting, Stevens, Chicago, Nov. 9-12.
National Association Practical Refrigerating Engineers, Stevens, Chicago, Nov. 10-13.
American Institute of Chemical Engineers, Annual Convention, Lord Baltimore Hotel, Baltimore, Md., Nov. 11-13.
Annual Convention, Packaging Machinery Mfrs. Institute, Nov. 11, 12, Edgewater Beach Hotel, Chicago.
International Acetylene Association, 37th Annual Convention, Jefferson Hotel, St. Louis, Mo., Nov. 18-20.

Federation of Paint and Varnish Production Clubs, Annual Convention and Paint Show, Drake Hotel, Chicago, Nov. 15-17.
National Paint, Varnish, and Lacquer Association, Annual Convention, Drake Hotel, Chicago, Nov. 18-20.
American Society of Mechanical Engineers, Annual Meeting, N. Y. City, Nov. 30-Dec. 4.
National Exposition of Power and Mechanical Engineering, Grand Central Palace, N. Y. City, Nov. 30-Dec. 5.
Independent Petroleum Association, Annual Meeting, Biltmore Hotel, Oklahoma City, Okla., Nov. 30-Dec. 1.
American Association Textile Chemists and Colorists, Annual Meeting, Providence, R. I., Dec. 4-5.
1st International Consumers' Petroleum Exposition, Convention Hall, Detroit, Mich., Dec. 5-13.
National Industrial Council, National Association of Manufacturers, Waldorf, N. Y. City, Dec. 7-8.
National Association of Insecticide & Disinfectant Manufacturers, Penn Athletic Club, Philadelphia, Dec. 7-8.
National Association of Manufacturers, Waldorf, N. Y. City, Dec. 9-10.
National Association of Dyers and Cleaners, 30th Annual Convention, Netherland-Plaza Hotel, Cincinnati, Ohio, probably Jan. 25-28, '37.
American Society for Testing Materials, Regional Meeting, Palmer House, Chicago, Mar. 1-5, '37.
American Ceramic Society, Annual Meeting, Waldorf-Astoria, N. Y. City, week of Mar. 21, '37.
12th Southern Textile Exposition, Textile Hall, Greenville, S. C., Apr. 5-10, '37.
International Association for Testing Materials, 2nd International Congress, London, Apr. 19-24, '37. K. Headlam-Morley, 28 Victoria st., London, S. W. 1.
American Society for Testing Materials, 40th Annual Meeting, Waldorf-Astoria, N. Y. City, June 28-July 2, '37.
"Achema VIII," Plant exhibition, in connection with 50th General Meeting of Verein Deutscher Chemiker, Frankfurt, Germany, Sept., 1937.
Exposition of Chemical Industries, Grand Central Palace, N. Y. City, Dec. 6-11, '37.



Because the movement of the universe responds to known and inflexible laws, a planetarium can recapture the heavens at any age in Earth's history or accurately forecast the sky of the future. And because Diamond Alkalies, too, are products of exact control, their user can eliminate possible uncertainties of the past and map his future course with assurance, insofar as his alkali ingredients are concerned. Throughout industry Diamond Alkalies are known as products of the highest quality, constantly uniform in strength and purity, and unfailingly dependable in supply.

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400; and Alaska's from \$1,021,700 to \$1,175,000.

German Chemical Situation Reviewed

Germany's dyestuffs export trade during the 1st half of the current year registered both volume and value gains over the 1st 6 months of '35, but value received was somewhat lower than the return for the corresponding months of '34—loss being due to lower prices and heavier shipments of low priced dyes to Oriental markets. Exports during the 1st half of '36 aggregated 18,785 metric tons valued at 68,478,000 marks (approximately \$27,391,000) compared with 17,446 tons, valued at 62,031,000 marks (\$24,812,000) in the corresponding period last year and 17,597 tons, valued at 73,147,000 marks (\$29,260,000) in the 1st 6 months of '34.

Current German output is far above the depression years and may be in excess of predivision records, a condition similar to the current situation in British dye producing circles.

Germany's duty free import quota of Chilean nitrates, originally set at 80,000 metric tons and increased to 85,120 tons for '35-'36 has been advanced further to 99,504 metric tons for the current fertilizer year. Increase, it is understood, is in accordance with Germany's agreement with the International Nitrogen Cartel which provides that Chile may supply 3½% of Germany's nitrogen fertilizer requirements, and indicates that consumption increased in that country 17% to the record breaking level of approximately 497,000 metric tons during the past fertilizer year.

Germany accepts natural Chilean nitrates, notwithstanding its enormous capacity for producing synthetic nitrogen, estimated at around 1,144,700 metric tons per annum in order to create credits in Chile for the purchase of German goods.

Continuing its policy of restricting imports in order to relieve the exchange situation, the German Government recently issued a new decree which becomes effective Oct. 1st, specifying that all red and white lead paint pigments as well as white lead sulfate shall contain 20% non-lead materials. Some time ago a decree was issued prohibiting altogether the use of lead pigments in paints for interior surfaces not exposed to the weather.

Review of Foreign Developments

Other outstanding developments of the month abroad include: Announcement that a process has been successfully developed in Japan on a laboratory scale for producing salt for soda ash production directly from sea brine. It will take another year however, before the process can be used commercially. A new company, Industrial Chemicals, Pty., Ltd., has been formed in Australia with a capital of £500,000. Manufacture of certain of

the explosives now made by I. C. I. of Australia and New Zealand and a number of industrial chemicals will be produced. I. C. I. has reached an agreement for pooling resources for the manufacture and distribution of insecticides and fungicides with the well-known firm of Cooper, McDougall and Robertson.

"Cavalcade of America" Returns to the Air

Du Pont Officials Widely Commended for their Foresight in Initiating this Outstanding Institutional Advertising Program—Grasselli Exhibits at Cleveland Exposition—Beacon Appoints London Representative—News of the Companies—

Du Pont resumed its "Cavalcade of America" dramatizations of episodes from the pageant of America's growth and development Wednesday, Sept. 30th, from 8:00 to 8:30 P. M., EST, over the nationwide Columbia network. During the summer months, the same sponsor has presented, in this weekly period, a series of musical programs, featuring 1st Arthur Pryor's Band and then Don Voorhees' Orchestra in programs tracing the origin and development of various types of music in America.

The fall and winter programs will present, in the same manner as the "Cavalcade" programs of the past year, which won widespread commendation from civic and educational leaders as well as the general public, authentic incidents and episodes in American life, stressing little-known human-interest dramas.

Du Pont will continue also to focus attention, in the "Cavalcade" programs, on the achievements of the research chemists and their contributions to modern life, with "Better Things for Better Living, Through Chemistry," as the theme.

Dr. Dixon Ryan Fox, President of Union College, and Dr. Arthur M. Schlesinger, professor of history at Harvard, will continue as historical consultants for "The Cavalcade of America," checking all scripts to assure historical accuracy. Programs are produced under the direction of Arthur Pryor, Jr., with Kenneth Webb as scriptist.

In order to provide a later broadcast period for west coast and Rocky Mountain listeners, "Cavalcade" will inaugurate a rebroadcast schedule on Oct. 15th. Although the eastern broadcasts will continue at 8:00 P. M., EST, Wednesdays, the rebroadcasts will be made at 11:30 P. M., EST, Thursdays, taking the program to the Pacific Standard zone at 8:30 P. M., the Mountain Standard zone at 9:30 P. M.

Largely Electroplating Chemicals

Grasselli exhibit at the National Metal Exposition in Cleveland, Oct. 19 to 23rd, will occupy space E-33 directly adjacent to the stairway leading to the lower level of the Lakeside Hall. Exhibit will feature 2 distinct groups of Grasselli chemicals.

A serious explosion destroyed the synthetic department of Montecatini's Savona plant last month. New specifications covering gum and wood turpentine and mineral spirits were recently issued by the British Standards Institution bringing the 3 items together under one specification known as No. 244.

First group will include an actual working demonstration of electroplating with Grasselli "Cadalyte." Souvenirs of the Exposition will be plated at the Grasselli exhibit to illustrate the results obtained with the Grasselli process. Hull and Strausser test equipment will also be on display for determining the thickness of Cadmium and Zinc deposits. Second distinct group of products will be chemicals for the steel industry, which will include chiefly acids, fluxes and inhibitors.

Beacon in Foreign Field

The Beacon Co., 89 Bickford st., Boston, manufacturer of waxes, products for producing emulsions, and other products used by industrial chemical and chemical specialty makers, has appointed Scott, Badger & Co., 109 Kingsway, London, W. C. 2, England, as exclusive agents for the United Kingdom and Ireland.

J. & L. Builds Miniature Works

A miniature steel works for developing the discoveries of its research engineers will be constructed by Jones & Laughlin. One of the very 1st of its kind in the country, midget plant will be equipped with actual steel-making units on a small scale capable of duplicating the operations in the big mills necessary to manufacture of iron and steel.

With the transfer of present research equipment and the purchase of additional machines, the research department in the new building will include practically all the facilities known to science for testing and examining steel, making this department one of the most complete in the country. An enlarged staff of trained scientists and technicians will conduct the experiments. New project is expected to be in operation by the end of the year.

Canister Wins Official Approval

The Mine Safety Appliances Co. of Braddock, Thomas and Meade st., Pittsburgh, Pa. has just announced that its Type GMA organic vapor canister for respiratory protection against organic vapors when the total concentration does not exceed 2% by volume in air has just received the approval of the Bureau of Mines. Approval was granted on the basis of meeting the requirements of the



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CRYSTALS, 30 - 33% — SOLID
AND FLAKE, 60 - 62%**

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The strength of this opinion lies in its growing out of years of day-to-day experience with these chemicals.

Dow Epsom Salt, Technical meets every industrial requirement and is recognized as being of the highest commercial quality.

Dow Sodium Sulphide is noted for its full, dependable

strength. Especially favored is its convenient flake form that resists solidification in storage.

These two chemicals are a part of the 250 different products bearing the Dow name. Each in its field is respected—for each represents the highest in chemical quality at the lowest feasible price.

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Carbon Bisulphide 99.99% • • Carbon Tetrachloride 99.9% • • Caustic
Soda, Flake and Solid • • Chloroform • • Epsom Salt, Technical • •
Ethyl Bromide • • Ethyl Chloride • • Ferric Chloride • • Magnesium
Chloride • • Monochlorobenzene • • Monochloroacetic Acid • • Phenol • •
Sodium Sulphide • • Sulphur Chloride

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Bureau of Mines Schedule 14D. This marks the 1st time that any mask of this type has been granted such approval, and hereafter all Type GMA Canisters made by the Mine Safety Appliances Co. will bear the label of Approval No. 1415.

Leeds & Northrup's Boston Office

A New England office, staffed for consulting and sales engineering service to those having problems of instrumentation in manufacturing processes, laboratories, power plants or educational institutions, has been opened recently in Boston by Leeds & Northrup. Their complete line of measuring, recording and controlling instruments, as well as their electric heat-treating furnaces, will be handled through this office. Address is 422 Chamber of Commerce Bldg., 80 Federal st.

New Stuffing Box Packing

The Goetze Gasket & Packing Co., of New Brunswick, N. J. has just completed another addition to their plant which was originally located on the present site in '11 This is the 4th addition which has been necessary since '28 to keep abreast of a rapidly expanding volume of business.

Among the newer developments are a stuffing box packing of unusually wide adaptability and a sheet packing that contains no rubber or other ingredients affected by oil, gasoline or certain chemicals and is suitable for temperatures and pressures greatly exceeding those for which sheet packings have heretofore been recommended.

Company News Briefly Reviewed

Minnesota Linseed Oil has been consolidated with the Minnesota Linseed Oil Paint, Minneapolis, and its business will be handled as a division of the paint company. The Minnesota Linseed Oil Division will have a separate organization and staff and its address will be 1101 Third st. South, Minneapolis.

The 7th annual All-Du Pont Sports Tournament, held at the Du Pont Country Club last month, attracted a field of 200 golfers and 50 tennis players. Representatives from all over the country attended.

E. G. McCloskey and M. W. C. Rouse, who recently retired from Davison Chemical, have formed a fertilizer manufacturing and distributing corporation, to be known as the M. D. R. Trading Corp. Offices are at 210 E. Redwood st., Baltimore.

Rumors are heard of the possible formation of a company at Bethlehem, Pa., to bleach hemp by secret processes now employed in foreign countries. Negotiations have been going on for several months.

Charles L. Read & Co., N. Y. City distributor of basic raw materials, such as linseed, turpentine, and alcohol, is now equipped to cover consumers located along the entire Atlantic Seaboard. Offices are at 120 Greenwich st.

A \$180,000 fire and 2 lives lost were the result of a carelessly thrown match in Seattle plant of the General Paint Co., on Sept. 16th.

The Clough Chemical Co., Montreal, Que., which has developed a line of sulfonated fat-liquor specialties for the Canadian tanning trade, has completed arrangements with the R. W. Taylor Co., Boston, Mass., for the manufacture of the same line for the American trade.

Armour is the latest to purchase new phosphate lands in Tennessee.

Herman Products, Inc., Allentown, Pa., is now Manufacturers Oils, Inc. No change has been made in the business structure of the company. Executive offices are still in the Hotel Traylor and the factory is located at 16th and Lawrence sts.

Gamble Wood Flour Co., E. 11th and D sts., Tacoma, is a new producer of wood flour.

New in the Field

New chemical companies reported last month: The Polar Chemical Co., Lewiston, Me., \$50,000; Omer Cloutier, Lewiston, Me., is president; Oneida Chemical Co., Utica, N. Y. \$10,000; The Coogan-Lawlor Chemical Co., 71 Spring st., Hamden, Conn., \$50,000, with \$10,000 subscribed; Colorchem, Inc., Elizabeth, N. J.; Harry B. Cutler, 125 Broad st., Elizabeth, N. J. is one of the stock subscribers; Claremont Chemical Wks., 60 Manhattan ave., Jersey City; Sav-Kol Co., Cleveland, is a new company to make chemicals for treating steam coal to increase its heating qualities; Superior Chemical is a newly formed distributor with offices in the Circle Tower Bldg., Indianapolis.

In New Locations

Offices of Electro Bleaching Gas and its affiliate, Niagara Alkali, are now located in new and more spacious quarters on the 30th floor of the Lincoln Bldg., 60 E. 42nd st., N. Y. City. Several other alkali companies are located in the same building.

Increased business, resulting in the need for larger and better office facilities, are responsible for this move. Both EBG and Niagara are known for pioneering activities in their respective fields. EBG was the 1st American producer of liquid chlorine. Niagara Alkali was the 1st to produce caustic potash and recently carbonate of potash in this country. These activities have brought a steady increase in the volume of the company's business. In the Lincoln Bldg., one of the world's most modern skyscrapers, these 2 pioneering companies will have more space and better facilities to serve their customers.

Wm. S. Gray & Co. has not moved from 342 Madison ave., N. Y. City, the building it has been located in for several years, but has been forced to take additional space because of increased business.

Thurston & Braidich, gums, is still another firm that has found need of larger quarters. New location is at 286 Spring st., N. Y. City, Walker 5-2447.

Cuno Sievers, chemical importers, N. Y. City, is another who owing to business expansion, has moved to larger quarters in the same building. He is at 101 Cedar st.

Other companies in new locations reported last month: George Chemical Co. from the Nelson Tower Bldg., N. Y. City, to the International Bldg., 630 5th ave., Circle 7-8221; Southern States Phosphate & Fertilizer will transfer its general sales offices from Augusta, Ga., to Savannah; Egyptian Lacquer Manufacturing's executive offices are now at Rockefeller Center, N. Y. City, Circle 6-3023; Geigy has moved its Charlotte, N. C. offices to the Thies-Crowell Bldg.; The Mimex Co., Long Island City lacquer and chemical specialty maker, to larger quarters in Long Island City at 45-13 Davis st.; Kingsbury & Co., fertilizers, is in new offices at 3001 N. Emerson ave., Indianapolis. J. Cline McKenna, Diamond's eastern representative is now in the International Bldg., 630 5th Ave., N. Y. City, Circle 7-4865.

Litigation

United Chromium Receives Set-Back in Patent Suit—United Carbon Wins Review on Property Assessment—Gyro Process in Dispute—

Litigation over the chromium plating patents reached a new stage last month when General Motors, New Departure Manufacturing Co., and the Bassick Co., were favored in the decision rendered in the U. S. Circuit Court of Appeals in the action alleging patent infringement in the use of chromium processes brought by United Chromium, Inc. A previous decision was reversed. Appeal may be taken by United Chromium Corp.

Decision held that the chromium processing issued to Dr. Colin G. Fink of Columbia University in 1926 and acquired by the United Chromium Corp., was invalid, court holding that the patent should have been granted to Marvin J. Udy, who was described by the court as "prior inventor" of the process. Udy was employed by United Chromium and applied for a patent on the process in June, 1924.

United Carbon carried its protest against an \$853,743 property assessment to the West Virginia Supreme Court last month and won a review.

Reuben J. Ravelle, of Toronto, is asking \$30,000,000 damages in suit filed in Federal District Court in Detroit against the Gyro Process Co., the Chemical Research Corp., and several oil companies which he said use the Gyro process of oil refining.

Chemical Construction Totals Impressive

Du Pont to Make Tetra Ethyl in New \$2,800,000 Plant at Baton Rouge—May Start 3rd "DuPrene" Plant Shortly—Ciba Breaks Ground at Summit, N. J.—Belknap Announces Monsanto Plans for a \$2,000,000 Phosphate Plant—Other Construction—

The name of du Pont was prominent in the construction news of the month. On Oct. 1st work started on a \$2,800,000 tetra ethyl fluid plant just north of Baton Rouge, La., to have a capacity of 1,200,000 lbs. a month. Operation is expected by June of next year. On Sept. 4th the Turner Construction Co. of Philadelphia was awarded the contract for a \$115,000 paint plant to be located at Grays Ferry Road, and at the recent A. C. S. meeting in Pittsburgh company officials were reported to have "talked" of a 3rd synthetic rubber plant in the near future.

Du Pont also announced last month completion of plans for a substantial increase in the capacity of the Cellophane plant at Amthill near Richmond, Va. Construction will be begun promptly and the plant will be in operation early in '37.

Monsanto to Build

A great amount of activity is now going on in the phosphate regions of Tennessee, and on Sept. 21st, Charles Belknap, executive vice-president of Monsanto, announced that construction on a \$2,000,000 phosphate plant would be started in October near Columbia. Three large electric furnaces will be ready for operation next summer.

Kamp Officiates at Ceremonies

Last month ground was broken for a \$500,000 plant for Ciba at Summit, N. J. H. Kamp, vice-president, sat at the controls of the steam shovel to start the work in the absence of the president Dr. James Brodbeck. Walter Kidde Constructors, Inc., N. Y. City, are the general contractors.

New Bromine Producer

Still another producer of bromine and bromine products from Michigan brine wells appears likely with the incorporation of the Great Lakes Chemical Corp., at Manistee, Mich. Company has been given permission to sell 400,000 shares of stock at \$1 per share.

Its president will be Joseph Horner, of Grand Rapids. Edwin N. Turner, of Manistee, will be vice president and general manager; A. L. Searles, of Grand Rapids, secretary-treasurer, and Oscar Larson, of Manistee and I. D. Bradbury, of Grand Rapids, directors.

Reilly Adds to Fairmount Plant

George F. Kucera, manager of Reilly Tar & Chemical's plant at Fairmount, W. Va., reports the \$100,000 addition is about 50% completed. Work was halted on construction for a time because of the rush in manufacturing to keep up with current orders.

Rayon producing capacity will be greatly expanded in the near future. Latest to announce building plans are: Industrial Rayon with a contemplated \$3,000,000 addition to the Cleveland factory, and Skenandoa Rayon at Utica, N. Y. with a "lift" from 4 million to 5 million pounds annually.

The Union Potash & Chemical, it is reported, will open a new potash mine and erect a refinery on its property located about 22 miles from Avalon, N. M. Plant will have an initial capacity of 10,000 tons daily. Industrial Minerals Corp. of America, Buffalo, N. Y., will remodel a barytes plant near Harrodsburg, Ky.

Wm. A. Harshaw Elected Chairman of the Board

Is Succeeded in the Presidency of Harshaw Chemical by His Son, William J. Harshaw—Work is New J. & L. Research Director—S.-W. Makes Several Important Personnel Changes—Others in New Positions—

William A. Harshaw has resigned as president of the Harshaw Chemical Co. and has been elected chairman of the board. William J. Harshaw, vice-president in charge of production has been elected president. He is a son of the new chairman of the board.

A Progressive Research Program

Harold K. Work has been appointed director of research to head the Research and Development Dept. of Jones & Laughlin Steel Corp.



DR. HAROLD K. WORK

Jones & Laughlin's new research director.

In addition to directing the present research staff, Mr. Work will have charge of the new miniature steel plant designed to correlate the work of the research and development engineers with the manufacturing operations.

Before coming to J. & L., Mr. Work was with the Aluminum Co. of America, having started in their research department in '29 at their Buffalo, N. Y. Plant.

General Aniline is reported ready to undertake a \$75,000 expansion at Linden, N. J. The Frederick Gumm Chemical (industrial detergents) will renovate a factory located at 538 Forest st., Kearny, N. J., and the Alabama Warehouse Co., Troy, Ala., will erect a \$25,000 acidulating plant for the manufacture of superphosphate.

Burkhart-Schier Chemical, which manufactures sulfonated oils, softeners and specialties for the textile trade, and industrial chemicals, announces the completion of a new \$50,000 warehouse and manufacturing plant.

The Coal Carbonizing Co. of St. Louis is considering the establishment of a \$600,000 unit in Belleville, Ill., to carbonize coal, reducing the fuel to coke.

Magnolia Petroleum and Phillips Petroleum have signed a joint agreement for the construction of a new carbon black plant in Moore County near Amarillo, Tex.

In '31 he was made head of the Electro-Chemical Division of the Aluminum Research Laboratories at New Kensington and in 1934 chemical engineer of the Jobbing Division.

Mr. Work was graduated from Columbia in '25 with his Bachelor of Arts degree and in '25 received his degree in Chemical Engineering. He then came to the Mellon where in '29 he was awarded his Ph. D. degree.

S.-W. Promotes 6 Executives

J. S. Prescott, superintendent of the Sherwin-Williams Cleveland paint and varnish plant, will become assistant to the general manager of manufacturing, and will review all plant expenditures and supervise the care and control of buildings and equipment. A. L. Smith, for 17 years superintendent of the company's Oakland (Cal.) plant, will succeed Mr. Prescott in Cleveland. Gilbert Hohmann, who has been Mr. Smith's assistant, will become superintendent at Oakland.

Sherwin-Williams also announces the promotion of 3 of its major executives. H. D. Whittlesey will be relieved of the duties of director of sales and distribution and will devote his entire time to executive duties. His place as director of sales and distribution will be filled by K. H. Wood. Vice-President A. W. Steudel becomes vice-president and general manager.

Johnson Heads Insecticide Dept.

Innis, Speiden's Conrad C. Johnson is now manager of the Insecticide Dept. handling Larvacide (Chlorpicrin), contact sprays and several specialties. For

the past 4 years Mr. Johnson has been active in field work on insect control problems of all kinds. Although his new duties will demand more of his time at the N. Y. office, his plans are to continue personal contact with the trade and their problems. It is believed that this will result in the most intelligent and practical service to firms writing in direct to the Company for advice on insect control.

Yant Joins Mine Safety

William P. Yant, well known to American industry as the chief chemist in the Health Division of the Bureau of Mines, has become director of research of Mine Safety Appliances Co., Pittsburgh, with whose activities as the world's largest manufacturer of approved safety equipment, his own work at the Bureau of Mines for years has been closely associated.

Hoffman Succeeds Burke

W. E. Burke, manager of the Trona plant of American Potash & Chemical, has resigned from active association with the company because of ill-health. He is succeeded by Albert A. Hoffman formerly associated with Anglo-Chilean Nitrate in Chile.

Cyanamid's Paper Chemicals

J. M. Walsh has been appointed acting sales manager of the paper chemicals division of Cyanamid, succeeding E. Y. Burcolter, resigned. Arthur H. French, formerly with Staley Starch, has joined this division as sales service representative.

Battelle's Latest Appointments

D. A. Roberts and E. E. Slowter have joined the staff of Battelle Memorial Institute, Columbus. Mr. Roberts was formerly with the W. E. Mowry Co. of St. Paul. His work with the Institute will be in metallurgy. Mr. Slowter was formerly with the Columbia Chemical division of Pittsburgh Plate Glass. At the Institute he will be engaged in various phases of research in chemical industry.

Cross Quits Pulp Products

J. M. Cross has resigned as sales manager of the Pulp Products Co., N. Y. City. Previously he was manager of the development dept. of Continental Can. He will reveal his new connection early in October.

Sacks Now with du Pont

Ward H. Sacks, well-known agronomist, with the National Fertilizer Association at one time and later with Cyanamid, is now on the du Pont ammonia dept. staff.

Other Personnel Changes

Other personnel news of last month: V.-C.'s new purchasing agent is H. H. Myers. Hugh Miller, former P. A. has been granted an indefinite leave of absence because of ill-health; C. Judson Hurd, formerly with Cyanamid, is now with Hercules Powder; T. G. Greaves, chief chemist at American Dyewood's

Mobile plant is now at the Chester, Pa. plant of the company; Alex M. Partansky, formerly a research associate at the University of Washington, is now with Dow at the Midland research laboratories; Truman A. Pascoe, former research director for Northwest Paper Co., is now technical director of the Nekoosa-Edwards Paper Co., Port Edwards, Wis.

A. O. Rogers, formerly with U. S. Gypsum, is now with the R. & H. division of du Pont as a research chemist at Niagara Falls; John M. Snell has resigned from Naugatuck Chemical to do research work on organic insecticides for Niagara Sprayer & Chemical at Middleport, N. Y.; D. L. Taylor, formerly doing research for Solvay Process at Hope-

well, is now with Hooker Electrochemical at Niagara Falls; Paul J. Witte is now on the staff of Lucius Pitkin, Inc., working on methods of inorganic analysis; Bernard Baruch, formerly heading the technical staff of M. J. Merkin Paint, is now with L. Sonneborn Sons, Inc., at the Belleville, N. J. laboratories.

James D. Todd, previously sales director, Ozark Smelting & Mining, is now assistant to President G. A. Goodell of Kentucky Color & Chemical; V. C. Bidlack has rejoined McCloskey Varnish as manager of technical service; Dr. Charles G. Moore, formerly with Glidden and later with Pure Calcium Products, has joined the research staff of Nubian Paint & Varnish, Chicago.

Landis and Midgley Selected for Society Honors

Cyanamid Vice-President to Receive Chemical Industry Medal on Nov. 6th—Midgley Voted '37 Perkin Medal for "Valuable Work in Applied Chemistry"—"Footnotes on Headliners"—

The Chemical Industry Medal Committee has elected Dr. Walter S. Landis, Cyanamid vice-president and one of the country's outstanding electrochemists, to receive the Chemical Industry Medal for '36. This medal is awarded annually to a person making a valuable application of chemical research to industry. Medalist is elected by the Medal Committee, the Executive Committee of the American Section of the Society of Chemical Industry. Medal will be presented on Nov. 6th at a meeting to be held at The Chemists' Club, N. Y. City.

The Perkin Medal Committee has elected Thomas Midgley, Jr. to receive the Perkin Medal for '37. This medal is awarded annually by the Society of Chemical Industry to a medalist elected by a committee representing the 5 chemical societies in the U. S. Award is made for valuable work in applied chemistry.

Medal will be presented on Jan. 8, '37 at a joint meeting of the Society of Chemical Industry and the A. C. S., to be held at The Chemists' Club, N. Y. City.

Water Chemists Acclaim Bean

Elwood L. Bean, chemist of the Scituate Reservoir division of the Department of Public Works of Providence, R. I., received the Dexter Brackett memorial medal at the opening session of the 55th annual convention of the New England Water Works Association at the Hotel Pennsylvania, N. Y. City, on Sept. 24th.

Heard and Overheard

Gen. Amos A. Fries former head of the Chemical Warfare Service, U. S. A., is now editor of *Our Navy*.

Frederick W. Pickard, a du Pont vice-president, has given a field house and locker room to Bowdoin College.

Roy H. Kienle, Calco, is the new chairman of the A. C. S. Paint & Varnish

Section; Dr. C. A. Knauss, director of sales service for Nuodex Products, Elizabeth, N. J., sailed Sept. 5th for a month's visit with the company's foreign customers; C. E. Michaux, du Pont's Paris representative, returned there early last month in the *Paris*; John L. Fas of the du Pont organization who has been in Europe for 2 months was aboard the *Normandie* when that ship arrived Sept. 15th; Arthur Langmeier, Hercules' naval stores sales director, left N. Y. City, Sept. 13th to visit company's European offices and representatives.

Dr. Jacques C. Morrell, associate director of research, Universal Oil Products, is the new chairman of the A. C. S. Petroleum Section; P. S. du Pont entertained 500 members of the Illuminating Engineering Association of Philadelphia at his estate "Longwood" on Sept. 16th. A private showing of the famous fountains was given.

Births

Mr. and Mrs. E. L. Luaces announce the arrival of a daughter. Mr. Luaces is well-known in the activated carbon field as a consultant.

Society for the Prevention of Asphyxial Death has been organized in N. Y. State by prominent medical and scientific men. Group plans to coordinate all agencies whose activities bring them into contact with asphyxial emergencies. Publicity program will be carried on by the S.P.A.D. throughout industry. Prominent members of the Advisory Board include E. R. Weidlein, well known director of Mellon Institute, and Dr. Alexis Carrel, Rockefeller Institute. Work of the society will be carried on by funds accumulated through memberships, cost being \$10 for a company and \$5 for an individual.

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CHEMICALS

Industrial Chemical Consumption Rises Seasonally

Activity in Process Industries Expands Encouragingly—Tin Quota Set at 90%—Alkali Shipments Heavy to Rayon Plants—Columbia Alkali Announces "Bicarb" Production—

September industrial chemical consumption reflected the improvement in activity in nearly all of the consuming fields. Steel reached 74.4% of mill capacity, a 6 year record, in the latter part of the month. Automobile producers in the last 10 days initiated heavier schedules for the '37 models, but the total for the 30 day period was only about 125,000 units. The textile, paper, glass, ceramics, rubber, and tanning fields were reported somewhat busier.

Newsprint figures make optimistic reading. Canada's August output was 14.6% ahead of August of last year and was the largest in history for that month. U. S. August total however, was 2% below the figure for the corresponding month of last year. Paper consumption probably will exceed the 1929 level this year. Consumption of kraft is already ahead of '29 figures. August crude rubber consumption was 46,657 tons, a 20% gain over last year. Usually September shows a sharp decline, but if preliminary figures for the 1st 15 days can be taken as indication for the entire month, the total should be about equal to August. Rubber consumption for the 1st 8 months has been 15.3% above last year's figure for the same period. According to Akron reports, tire shipments to dealers have been greater than the output for each month since February and producers' inventories are smaller than at any time in the past 3 years. Labor unrest is still prevalent in Akron. Suppliers of chemicals to the rubber field will be interested to know that a number of the companies there are following the example of the textile industry in the Paterson-Passaic territory and are decentralizing manufacturing operations. General has taken a plant at Wabash, Ind., Goodyear one at Windsor, Vt., and Goodrich one at Oaks, Pa.

Gasoline stocks have been showing a rather steady decline over the past several weeks. Refinery operations showed a slight decline in September and in the last half were at about 79% of capacity. Bureau of Mines has recommended a daily crude oil production of 2,842,300 bbls. for October, 21,700 bbls. lower than the September rate but 288,100 higher than for October a year ago.

Tin Restriction Plan Looks Favorable

The tin output for the final quarter has been set at 90%. The International Committee will meet at the Hague not later than Oct. 23rd to continue negotiations for the renewal of the restriction plan and the outlook now is for an agreement with some slight modifications. The statistical positions of zinc, lead, and copper have shown steady im-

Important Price Changes		
ADVANCED		
	Sept. 30	Aug. 31
Ammonium bifluoride	\$0.16	\$0.15
Antimony	.12½	.11½
Mercury oxide, yellow, tech.	1.39	1.29
Potassium meta-bisulfite	.15	.13¾
Tin crystals	.35	.34
Metal	.45	.427½
Oxide	.49	.47
Tetrachloride	.23¼	.21¾

provement in the past few months and early price rises are being rather freely predicted.

Alkali sales, largely the result of the booming rayon industry, are close to record proportions. Consumption of caustic in this field alone this year should reach 125,000 tons.

Few price changes occurred. Tin derivatives were advanced when the metal went to higher levels. Announcements of the '37 contract prices are likely to be much later than usual because of the confusion over the Robinson-Patman Law and the presidential election. The unsettled foreign financial and political situation will have an effect on certain of the imported items.

Byproduct Sulfuric Production

Output of byproduct sulfuric at copper and zinc plants in '35, in terms of 60° Baume acid, amounted to 603,627 short tons, of which 160,151 tons were produced at copper plants and 443,476 tons at zinc plants. Acid reported is exclusive of that made from pyrites concentrates in Montana and Tennessee. At zinc plants 23,570 tons of sulfur were used to supplement the gases derived from the roasting of zinc blende, and 90,884 tons of

sulfuric were produced therefrom. No sulfur was used at copper plants.

In '34, 575,660 tons of byproduct sulfuric were produced. Of this amount 168,676 tons were recovered at copper plants and 406,984 tons at zinc plants. Sulfur amounting to 23,424 tons was used at zinc plants for the recovery of 89,162 tons of sulfuric.

First Chlorine: Now "Bicarb"

Consumers of sodium bicarbonate will take interest in the announcement that Columbia Alkali, a subsidiary of Pittsburgh Plate Glass, has recently opened a new plant for the manufacture of "bicarb." This important step follows rapidly on the heels of the opening by that Company of a new plant for the production of liquid chlorine. See C. I., September, '36, p298.

It was a logical step that Columbia, long occupying a position of leadership in caustic and ash, should add to their service the department for bicarbonate of soda. A new plant with entirely new equipment of the most improved design has been established on the Corporation's property at Barberton, Ohio, and production of both technical and U. S. P. grades is already under way.

Columbia "bicarb" is shipped in the usual packings, lined and unlined burlap bags, paper bags, kegs, and barrels. An elaborate screening equipment guarantees fine screening of the commodity for the needs of millers and repackers for the drug trade. Company states that it is prepared to furnish bicarbonate of soda in any physical form required for any industrial or pharmaceutical purpose.

Executive offices of Columbia Alkali are at 30 Rockefeller Plaza, (Radio City), N. Y. City, while branch sales offices are maintained at Chicago, Cincinnati, Pittsburgh and at the plant in Barberton, Ohio.

Mercury Soars to New High; Mercurials Advanced

No Relief in Sight Until Spanish Civil War Ends—Italy Ships 300 Flasks—C. P. Glycerine Now at 19½¢—Importers Fear Further Rises as a Result of European Currency Exchange Warfare—

Mercury was easily the feature of the fine chemical markets last month. Quotations reached \$90 a flask, and according to market experts, the end of the rise is still not in sight. Producers of the mercurials could no longer afford to ignore the advance in the metal and instituted sharp rises. Supplies of domestic mercury are coming in in very small lots and none has arrived from Spain in many weeks. The tension was lessened somewhat last month with the arrival of 300 flasks from Italy, the 1st consignment from that country in several years. About 75% of the Italian shipment however, was sold before arrival so that the spot market was little affected.

Important Price Changes		
ADVANCED		
	Sept. 30	Aug. 31
Calomel	\$1.32	\$1.16
Corrosive sublimate	1.14	.87
Glycerine, C. P.	.19½	.17½
Mercury	90.00	80.00
Mercury oxide, yellow		
U. S. P.	1.81	1.71
Red precipitate, U. S. P.	1.64	1.54
White precipitate, U. S. P.	1.66	1.56
DECLINED		
Iron-ammonia citrate:		
Brown	\$0.37	\$0.39
Green	.37	.39
Platinum	59.00	64.00

Speculative rise in platinum appeared over. It was said purchases as low as \$55 were made.

Total volume of business transacted in fine chemicals and pharmaceuticals last month was reported very satisfactory. Demand for winter seasonal items has increased.

Glycerine schedules were again advanced at the close of September with the refined grade now quoted at 19½c, an advance of 2c a pound. The uncertainty over European currencies and the inability of importers to obtain firm quotations from abroad were the principal factors in the forcing of the item to much higher levels.

New U. S. Mercury Source Found

Mercury ore deposits have been discovered by gold miners at the United Mining Co. mines near Ashland, Ala. Tests made by B. L. Adams Co. chemists show 14.5 lbs. mercury per ton of ore. Small amounts of platinum have also been discovered in hills near Anniston.

Obituaries

George F. Hasslacher

George F. Hasslacher, 41, son of Jacob Hasslacher a founder of the firm of Roessler & Hasslacher Chemical, accidentally on Sept. 15th in a fall from the window of his office at 10 E. 40th st., N. Y. City. He was a former director and assistant secretary of R. & H., and for the past few years had been financially interested in several firms developing chemical processes.

He was a member of the Princeton Club, The Chemists Club, the University Club, the Baltusrol Golf Club and the Short Hills Club. He is survived by his wife, Esther; 2 sons, James and George Frank Jr., and his mother, Mrs. Jacob Hasslacher of 480 Park ave.

Fred L. Somers

Fred L. Somers, 37, vice-president and general manager, Fred L. Lavanburg Dry Color Co., Brooklyn, on Sept. 5th, of a heart ailment caused by a streptococcus infection. He was a former president of the Dry Color Association, a member of the National Paint, Oil and Varnish Association, the Drug and Chemical Club, the Downtown Athletic Club, the Brooklyn Rotary Club, the Army and Navy Club and was a director of the Lower East Side Community Council.

Francis C. Goldsborough

Francis C. Goldsborough, 51, U. S. I. eastern sales manager since '33, and previously sales manager of American Solvent & Chemical from the formation of the company in '27 to its sale to Commercial Solvents in '33, on Sept. 22nd, following a long illness induced by an attack of pneumonia. In his youth he spent several years in South American oil fields.

Prof. Alfred White

Prof. Alfred White, 32, head of the Dept. of Chemical Engineering, University of Virginia, on Sept. 23rd, of nephritis. He was the son of Prof. Alfred H. White, well-known head of the Chemical Engineering Dept. of the University of Michigan.

Other Deaths of the Month

A. G. Watt, president of A. G. Watt Co., Cleveland jobbing firm, on Sept. 1st, following an illness of 2 months. He started with S.-W. in the purchasing dept. in 1907. In '17 he became connected with E. M. & F. Waldo Co. as its mid-western representative and 2 years later opened his own offices in Cleveland. Business will be continued by his widow.

James F. Lucas, 79, former secretary and treasurer of the paint firm, John Lucas & Co., on Sept. 5th of a heart attack.

Lorenzo A. Wilson, one of the most widely known fertilizer men in the industry, on Sept. 9th. He was one of the pioneers in the fertilizer industry in Florida and was an active and influential factor in the civic and commercial affairs of Jacksonville for more than 40 years.

George K. Redding, 39, chief chemist, Larrowe Milling Co., Rossford, Ohio, on Sept. 12th from meningitis.

Charles Malott, nationally known figure in the paint field, on Sept. 12th, following an illness of 2½ years duration. He was active in the affairs of his companies however, to within a few days of his death.

Rudolph H. Abraham, 84, president, Mayer & Loewenstein, Long Island City paint and lacquer firm, on Sept. 7th, following a short illness.

George A. Hendrie, 50, secretary and technical director of Chemnyco, Inc., a subsidiary of American I. G., of a heart attack on Sept. 23rd, 3 days after the death of his wife. He was with Cyanamid at one time.

Svend Svendsen, 55, well-known metallurgist, on Sept. 21st. He was with Burgess Laboratories from '30 to '35; previous to that he spent 20 years in developing processes for producing lead, antimony, bismuth, and aluminum; and in the past year he has been engaged in research work for Glidden.

Associations

Kelly Crowned Golf "Champ"

Cup emblematic of the golf championship of the Chemical Salesmen's Association was awarded to Charles Kelly, Hagerty Bros., N. Y. City, at the final tournament of the season held Sept. 15th at Pomonok Golf Club, Flushing, L. I. New champion's low gross score was an 80, clinched by holing a 25 putt on the last green. W. D. Merrill, Jos. Turner

& Co., and F. A. Neuberg, Warner Chemical, tied for 2nd place, each with an 81.

In the handicap competition D. W. Thompson, Mathieson, placed 1st in class A, followed by R. C. Quortrup, Barrett Co., and P. C. Reilly, Reilly Tar & Chem. Corp. In class B, George Bode, du Pont took 1st place, with C. M. Frost, Prior Chemical 2nd, and F. W. Green, National Aniline & Chemical Co., 3rd. In the member kickers' handicap J. Alvarez, Grasselli, won 1st prize, with the other awards going to C. O. Lind, Dow, and W. I. Galliher, Columbia Alkali. Winners in the guest kickers' competition were S. F. Walters, Chas. Alexander, and C. L. Lightfoot.

Special prizes were awarded on the basis of kickers' handicaps for the 4 season tournaments. In this group 1st prize went to Fraser Moffatt, U. S. I., with R. E. Dorland, Dow, 2nd, and H. Kranich, Kranich Soap Works, 3rd. Guest low gross prize went to H. H. Finn, Standard Oil Co., of N. J., G. Furman, Merck, had the longest drive and E. W. Haley, Columbia Alkali, won an award for dropping his tee shot closest to the pin. Walter Buehler, Barrett Co., scored the lowest number of putts. An innovation this year was a non-players prize drawn by Grant A. Dorland, MacNair-Dorland Co.

Attendance at the final tournament numbered 93. Following dinner at the Pomonok Club a floor show was put on. Arrangements for the outing were made by B. J. Gogarty, Commercial Solvents.

What is "Air Conditioning"

A co-operative educational campaign to explain what "air conditioning" is and is not has been undertaken by Air Conditioning Manufacturers Association, Washington, and Kinetic Chemicals, Inc., Wilmington, a du Pont subsidiary, which makes refrigerants. Definitions of summer, winter and year-round conditioning are those adopted by the U. S. Department of Commerce and the National Better Business Bureau.

Leather Chemists' New Secretary

American Leather Chemists' Association reports that its previous secretary and treasurer, H. C. Reed, has been elected to the position of vice-president. Elected to the dual-office held by Mr. Reed, is C. A. Blair, who at Skytop, last Spring, was appointed vice-president. New official address of the association will be at Mr. Blair's office, 279½ Mulberry st., Newark, N. J.

Sulfonated Oil Makers Meet

The Sulfonated Oil Manufacturers Association held a 2-day fall outing at the Manufacturers Country Club, Oreland, Pa., on Sept. 28 and 29th. Fred C. Scholler of Scholler Brothers and E. E. Yoke, executive vice-president of the association were in charge of the arrangements.

Instructive Metal Exhibit

American Institute of Mining and Metallurgical Engineers in cooperation with the Metal Products Exhibits, Inc., has assembled a most interesting and instructive exhibition which reveals the metallic elements present in the earth's crust, their availability, the locations of commercial sources and the flow of metals and minerals in world trade. Genuine ores, metals, and typical fabricated metal products, including specimens and displays supplied by State and Federal agencies as well as the major metal producing companies, will be shown. This special exposition will be shown from Aug. 17th to Oct. 17th at the Metal Products Exhibits in the International Building at Rockefeller Center, N. Y. City. It is open every weekday from 10 A.M. to 6 P. M. except Saturday when the closing hour is 3 P.M. Admission is free.

N. Y. Textile Chemists to Meet

The N. Y. Section of the American Association of Textile Colorists and Chemists will meet at the Swiss Chalet located a few miles out from the George Washington Bridge on Oct. 23rd.

Cracking Conference Held

Eighth annual Cracking Development Conference, attended by a group of leading petroleum technologists, held its sessions, Sept. 22, 23, and 24th, at Essex House in N. Y. City. Participating in the conference were representatives of the Standard Oil Co. (Indiana), The Texas Co., The Standard of N. J., Gasoline Products, and The M. W. Kellogg Co. William F. Moore, president, Gasoline Products, was general chairman of the meetings. Members of the Cracking Development Conference meet annually to consider the latest advances in design and engineering, research and development, and plant operation, pertaining to the processes of cracking for the production of gasoline.

Packaging Machinery Meeting

The Annual Convention of the Packaging Machinery Manufacturers Institute will be held on Nov. 11-12th at the Edgewater Beach Hotel in Chicago. Sales problems and policies of the industry will be discussed.

General Plastics' New Financing

Directors of General Plastics plan to ask stockholders to approve declaration of a dividend of 50c a share on the common which will be payable in new 5% \$25 par preferred stock. On 100 shares of common, this would be equivalent to 2 shares of new preferred. New preferred will be convertible for 5 years into common at the rate of 3 shares of preferred for one common and will be callable at 26. Regular quarterly dividend of 25c a share was also declared. Fractional warrants will be issued.

U. S. I. Celebrates 30 Years of Service

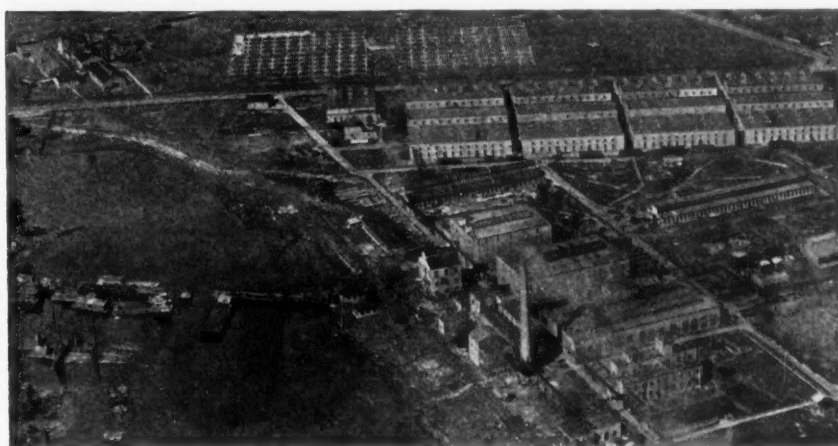
Company Formed Shortly After Passage of the Denatured Alcohol Law of 1906—Its Technicians Have Developed Many New Processes—Much Firmer Price Trend in Solvents Reported—

Substantial expansion in the manufacture of industrial alcohol began just 30 years ago, when Congress passed the Denatured Alcohol Law of 1906 and the U. S. Industrial Alcohol Co. was organized. Because of the heavy tax on ethyl alcohol before 1906, there was little incentive to find new uses for it. When applied chemistry was coming into its period of greatest development, about 1900, alcohol was used "industrially" for the preparation of medicines and perfumes, and, in limited quantities, as a solvent.

Important Price Changes

	ADVANCED	
	Sept. 30	Aug. 31
Alcohol, spec. denat.		
No. 1, tks.	\$0.26	\$0.23
Ethyl acetate, tks. ....	.06½	.06
Drs. ....	.07½	.07
Isopropyl acetate, tks. ....	.06½	.06
Drs. ....	.07½	.07
Methanol, denat. grade, tks. ....	.45	.40

U. S. I. played a large part in developing and furthering uses for alcohol in the years that followed. By cooperating with



Largest Industrial Alcohol Plant in the World—U. S. I.'s Baltimore Works

At this period certain industries, particularly the hat manufacturers, sponsored legislation which resulted in the passage of the Denatured Alcohol Law of 1906. This bill authorized the sale of alcohol for industrial purposes free of the burdensome tax.

The U. S. Industrial Alcohol Co., was incorporated on Oct. 17, 1906, shortly after the new law was passed, and was ready to deliver alcohol when the law became effective on Jan. 1, 1907.

During the 1st year under the new law, production for the industry amounted to less than 2 million gals. This consisted of Completely Denatured Formula Nos. 1 and 2 and Specially Denatured Alcohol, Formula No. 1.

Most of the industrial alcohol was manufactured at that time from domestic grain. However, a search for cheaper raw material led to the successful utilization of blackstrap molasses. U. S. I. chemists contributed much to the development of methods for using molasses to produce high quality ethyl alcohol.

Lighting and heating were the principal outlets for Completely Denatured Alcohol in 1907, while Specially Denatured Alcohol had already assumed importance as a shellac solvent.

consumers, the Company aided them in the selection of formulas suited to their needs and carried on extensive research to find new uses. As a result of these efforts and the general expansion occurring in the chemical field, the number of formulas began to grow and consumption to increase. At the beginning of the World War, industrial alcohol production amounted to more than 10 million gals. per year.

During the World War, alcohol became recognized as one of the leading essential raw materials. Large quantities were required for miscellaneous war materials, munitions, dopes for airplanes, gases and medical supplies. A large use of alcohol was for the manufacture of acetone—a very important military powder raw material.

At the beginning of the war, the major production of acetone was from acetate of lime made by wood distillation, but the supply was limited. U. S. I. installed large converters for producing vinegar (dilute acetic acid) by oxidation of ethyl alcohol, thence to acetate of lime, so supplementing the needs of the nation. Research work eventually led to the development of a process for producing acetone by fermentation, and much of the material

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needed was made in this way during the later years of the war.

In the acetone fermentation process, both ethyl alcohol and normal butyl alcohol existed. War production of acetone resulted, therefore, in a tremendous accumulated gallonage of butyl alcohol.

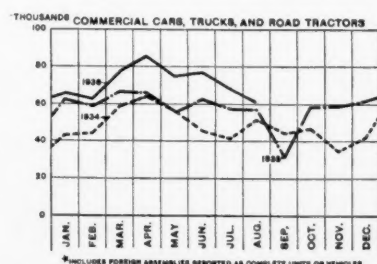
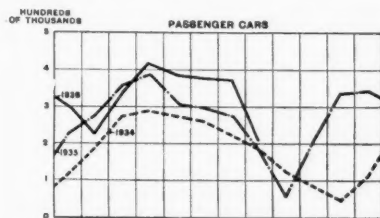
One of the chemical developments of the early '20's was that of low-viscosity nitrocellulose. This material made possible the production of a serviceable automobile lacquer. Butyl alcohol and butyl acetate were found most adaptable to this new use, and with the phenomenal expansion of the motor car industry within these few years, the surplus of butyl alcohol was rapidly absorbed.

Production of acetone from grain by a patented process was the original method, and was not employed by U. S. I. at that time. However, in subsequent years, U. S. I. chemists developed a new process for direct fermentation of molasses to acetone, and this process is now in operation at the Company's Baltimore Plant. During these years, the Company was carrying on development work to allow the production of other alcohol-derived chemicals. Today the U. S. Industrial Chemical Co., Inc., which had its beginning in 1917, offers a full line of alcohol chemicals.

The U. S. Industrial Alcohol Co. and its subsidiary, U. S. Industrial Chemical Co., Inc., are marking this anniversary with special issues of their publications, *Alcohol News* and *Solvent News*.

Less Demand but Firmer Prices

Demand for solvents declined sharply in September, particularly in the midwest area, due primarily to the temporary slackness in the automotive field. Lacquer



Trend in automotive sales shown graphically by the Bureau of the Census

producers in the last few days of the month however, increased activity, anticipating heavy tonnages in the last quarter from the body builders and from the rubber industries.

No change in the tank car price struc-

ture was reported for the petroleum solvents, but several adjustments were made in the tankwagon quotations. A six-tenths of a cent reduction in all grades of naphtha in the states of Michigan, Indiana, Illinois, Wisconsin, Minnesota, Missouri, Kansas, the Dakotas, and Iowa; a 1½c decline in petroleum thinner in Buffalo were 2 of the price revisions reported. A change in quotations for small quantities of petroleum thinner in both tank-wagons and drums in the N. Y. City and Long Island area was also reported earlier in the month.

A decidedly firmer tone is noted in ethyl acetate and isopropyl acetate. Effective Oct. 1st 4th quarter quotations are based on 6½c in tanks for both items.

Rayon Production at Record Levels; Shortage Feared

Purchasing of Textile and Tanning Chemicals Improves as Consumers' Stocks Dwindle—Shoe Production for '36 May Exceed All-Time Record Made Last Year—Corn Derivatives Steady—

Textile and tanning chemicals were in much better demand in September, indicating that consumer reserve stocks have finally reached the replacement stage. Although both fields have been very busy for the past 3 months, purchasing of chemicals has been relatively light over that period. Shipments over the final quarter are likely to be in good volume.

Rayon shipments in August set a new high record and September may have "topped" this figure, for the plants are working at full capacity in nearly every instance. Stocks are at the ridiculously low point of four-tenths of a month supply. August cotton consumption (574,289 bales) was the highest for that month since 1927 with the exception of '33, and was 40% above the corresponding month of last year. August cotton spinning was at 115.8% of capacity, on a single shift basis, compared with 119.8% in July and 76.4% during August of last year. September figures are likely to show a small gain over August. Further improvement is reported in silk and a fall shortage of rayon should help the silk factors.

Demand for wool has slackened appreciably, according to the *Commercial Bulletin* of Boston. It states that while the mills are busy turning out goods against old contracts, there is comparatively little new business. In many quarters however, this is considered but a temporary situation, largely caused by adverse weather.

Conditions in the Paterson area improved last month and the finishing and dyeing plants are expected to operate at capacity in October on fall and winter goods. Only one large plant has failed to sign a contract with the dyers' union. Temporarily at least the labor situation has taken a turn for the better.

Additional evidence of a strengthening price structure in the solvents was seen in the 5c advance announced early in October for denaturing methanol. Current quotations are now 45c for contract and 48c for spot tanks. Corresponding advances were made in the c.l. and l.c.l. drum prices.

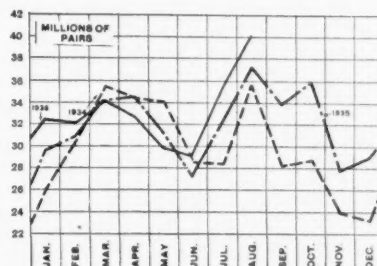
A much firmer price trend is readily apparent in the alcohol field. Specially denatured No. 1 was advanced 3c and is now quoted at 26c in tanks and 32 to 37c in drums. Quotations on special solvent were unchanged at the works but the special price in the Metropolitan area was advanced 2c to 24c at the works, making a uniform price of 24c for all Eastern shipments.

Important Price Changes

ADVANCED		
	Sept. 30	Aug. 31
Myrobalans J1	\$24.00	\$23.00
Valonia beads	52.00	46.00
Wattle bark	30.00	29.00
DECLINED		
Zinc dust	\$0.0685	\$0.0755

Tanners Expand Operations

Tanners and shoe manufacturers enter the fall season with a heavy volume of business, a strengthening of the price structure and promising prospects for the balance of the year. Tanners have been buying hides heavily. From July 17th to



Current shoe production is ahead of '35.

the middle of September nearly 1,500,000 hides have been purchased. Tanners lost some immediate business at the Spring Leather Showing of the Tanners' Council, held at the Waldorf in N. Y. City last month, because of their insistence on better prices, but they are confident that this situation is only temporary.

Predictions are now made that shoe production for '36, which it was feared might run behind a year ago in the 2nd half is now quite likely to exceed the record-breaking output of 383,761,000 pairs of '35, which in turn surpassed '34 production by 26,640,000 pairs, or a 7.4% gain. August production was 40,068,584

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pairs, compared with 35,209,500 in July and 37,243,414 in August of last year. The 8 month's total is 265,500,852 pairs, compared with 257,241,128 for the corresponding period of '35, an increase of 3.2%.

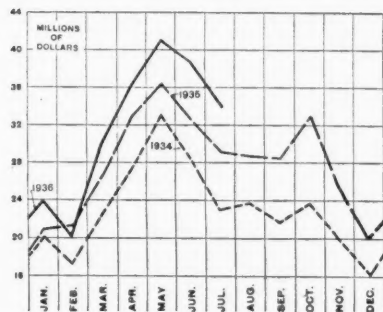
Smallest Corn Crop in 55 Years

The price structure of the corn derivatives remained unchanged last month.

Sharp Advances Ends Chrome Yellow "Price War"

Chrome Green Quotations are Also Adjusted—Fall Paint Season at Satisfactory Level—Residential Building at 5-Year Peak—Lead Statistics "Eyed" for Possible Future Pigments Rise—

The severe competition of the past year or so in chrome green and chrome yellow now appears ended with an announcement of a 1½¢ advance in the former and a 1¢ increase in the latter, both effective Oct. 1st. Stearic acid prices rose sharply in September, and the paint field anticipates a 1¢ advance in the stearates. Spanish red



Paint Sales—Paint manufacturers are enjoying the best year since 1929.

oxide prices are now strictly nominal. Importers are still taking care of regular customers, but spot stocks are unavailable. Red vermillion is higher, the result of the sensational rise in mercury. Shipments of zinc oxide were in heavy volume as buyers sought to obtain a surplus over current needs before the higher levels became effective Oct. 1st.

Volume of raw paint materials moving into consumers' hands indicates a very satisfactory fall paint season. While paint production totals followed the usual declining trend in June, July, August, and part of September, there is every reason now to believe that the usual fall rise in the last half of September and the 1st part of October will again take place. Volume continues to show a decided improvement over the corresponding periods of last year. For the 1st 7 months of '36 sales of paints, varnishes, lacquer and fillers by 578 producers have totalled \$223,710,582 as against \$198,920,988 in the same period of '35 and but \$171,261,034 in '34.

May Reach 300,000 Units this Month

September automotive production was about 125,000 units, but in October 300,000 are expected. In October a year ago 280,000 units were turned out. Output

With the poorest corn crop in 55 years assured it would appear that starch and dextrin prices will remain firm and may point higher if consumption expands further. A good demand exists for egg products and production is off 14% from the average of the 5 year period, '28-'32. Firmer prices are reported for the sulfonated oils. The fish oils were steady with little alteration in the quotations.

Important Price Changes

ADVANCED

	Sept. 30	Aug. 31
Chrome Green	\$0.18½	\$0.17
Chrome Yellow .....	.12	.11
Vermillion	1.65	1.52

for the final quarter should be greater than the 1,071,630 cars produced in the last quarter of '35.

Residential building in August attained a level of activity not seen since March, 1931, according to the F. W. Dodge Corp. monthly report. August exceeded July's figure by about 41% and was 2½ times August of last year.

Total volume of construction awards, covering all types of work, undertaken in 37 eastern states during August amounted to \$275,281,400; this was in contrast with \$294,734,500 reported for July of this year and represents a gain of about 63% over the figure of \$168,557,200 reported for August, '35. Decline from July was chiefly the result of decreased contract lettings for civil engineering projects under the PWA program.

Lead Stocks at Low Point

Consumers of lead pigments are eyeing the lead statistics very closely now. Lead stocks are at the lowest point since early in '34 and many consumers would not be greatly surprised if higher prices were announced within the next 30 days.

Naval Stores

Production of rosin and turpentine will be 10% below the original estimates as a result of the withdrawal of about 14,000,000 cups from production. It is estimated that the crop will be reduced by about 30,000 bbls. of turpentine and 100,000 bbls. of rosin.

Turpentine prices declined rather sharply last month in the face of very light demand. Rosin prices were fairly steady. The uncertainty over the amount of stocks still held by the Government is the leading factor influencing buyers against adopting a more progressive forward purchasing viewpoint at the moment.

In certain quarters another sizable upward price movement is looked for before the end of the year. Statistical position

of rosins is expected to improve. Stocks in the South now are approximately 150,000 bbls. smaller than a year ago, and it is generally believed that stocks in the hands of American consumers also are 50,000 to 100,000 bbls. less than a year ago. Thus total stocks are about 200,000 to 250,000 bbls. smaller than last year at this time, according to a recent survey by the *N. Y. Journal of Commerce*. Furthermore, the Government holds about 40% of the total stocks in the South, or about 120,000 to 130,000 which can be considered as strongly held.

Total visible supplies of turpentine now are approximately 170,000 bbls., or only slightly lower than last year. However, about 95,000 are held by the Commodity Credit Corp., and the market feels reasonably safe that these stocks will not be liquidated at present prices, since these stocks cost the Government about 56¢.

While a substantial increase in American purchases of turpentine is expected during the coming months, some concern is being felt about the London turpentine situation. London is supposed to have enough stocks of turpentine on hand to last until the beginning of the next naval stores season, next March, and seems to have assumed, for the time being, an attitude of absolute indifference, according to the *Naval Stores Review*.

Oils and Fats

The downward trend in Chinawood which has been going on now for several months continued in September when offerings in the primary center were considerably increased. Coconut, on the other hand, rose sharply, largely as a result of light offerings. Most of the animal oils were quoted higher in September. Stearic acid and red oil were advanced too, owing to the higher cost of basic materials. Trading in Menhaden became more active. Producers in the Baltimore area were said to have withdrawn quotations and were asking for bids. Market for linseed was quiet. Mill workers are striking in Minneapolis and flax shipments have been diverted to plants at Red Wing, Milwaukee, and Chicago.

Many factors are bullish on cottonseed oil because of the recent sensational cotton crop report and the possibility of an oils shortage. Others point out that any precipitous rise in cotton oil prices now would be checked by the supplies of lard now on hand.

An interesting angle to the oils markets is the strong likelihood that cottonseed oil futures and soybean futures will be traded in on the Chicago Board of Trade within a very short time.

Regulations covering the payment of excise taxes on various oils, imposed by the revenue acts of '34 and '36, have just been issued by the Bureau of Internal Revenue as T. D. 4695.

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*Further information and quotations will be furnished on request.
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- Persulphates
- Persulphate of Ammonia
- Persulphate of Potash
- Stearates of
- Aluminum
- Calcium
- Magnesium
- Zinc U. S. P.



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**FOR
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F. T. C. Releases Fertilizer Trade Practice Rules

Disappointment Voiced that Plan Does Not Provide for an Effective Price-Reporting Plan to Check Price Cutting—Japs Invade I. C. I.'s Indian Sulfate Markets—August Tag Sales at High Point—

Outstanding development in the fertilizer industry was the release on Sept. 24th by the Federal Trade Commission of the tentatively approved proposed trade practice rules. Commission announced at the same time that public hearings would be held on Oct. 9th.

There is very little to report on prices other than the dollar a ton increase for nitrate which went into effect as of Oct. 1st (reported in the September issue) and the expiration of the 5% discount on potash effective on the same date. Organic ammoniates moved into higher ground in the 1st 3 weeks of the month, but lost a part of the gains in the final week.

A rather critical condition is said to be developing in the international sulfate market. Japanese producers are reported to have taken 3 orders for large tonnages in the Indian market recently at \$27 a ton laid down in Bombay, total being close to 17,000 tons. Last of the 3 orders was placed for 3,000 tons in the last week in September. It is said that the British I. C. I. refused to meet the \$27 price, believing that the Japanese producers are again over-selling their capacity. It is further rumored that the Japanese have already made inquiries in London and N. Y. City for quotations on sizable quantities.

Superphosphate prices for the southeast were finally announced last month and they are said to be around \$2 a ton lower than those prevailing last year and almost as low as those named in Baltimore. Competition is extremely keen.

August Sales 36% Greater

August tag sales were by far the largest for any August in many years; 36% greater in the 12 southern states and 50% greater in the midwest. August sales in the south are usually about 1.2% of the total and about 14% of the total in the midwestern states. Total sales in August were 153,145 tons, compared with 106,137 in '35 and 103,248 in '34. January-August total was 4,080,733, compared with 3,763,041 in the corresponding period of '35 and 3,350,085 tons for the 1st 8 months of '34. Substantial improvement in fertilizer sales during the coming months is now anticipated in the trade. Current high prices for most farm products will doubtless stimulate greater plantings this fall and spring and the farmers will be able to use increased amounts of fertilizer per acre.

A different method of marketing bagged nitrate in the south is announced. Domestic factors are reported to have withdrawn

Important Price Changes		
ADVANCED		
	Sept. 30	Aug. 31
Blood, dried, N. Y.	\$4.20	\$4.00
Chgo.	4.25	4.00
Bone, raw, imp.	30.00	28.00
Castor pomace, dom.	18.50	15.50
Nitrogenous mat., imp. ...	2.85	2.75
Tankage, imp.	3.75	3.65
DECLINED		
Hoof meal	\$2.80	\$3.00

prices for resale nitrate and to have appointed distributors to handle sales to the consuming trade.

Cresylic Acid Shortage Continues Acute

Benzol Shipments Decline in First Half of September But Improve in Last Two Weeks—Coal Tar Solvents Scarce—Demand for Intermediates and Dyes Improves—

Spot stocks of the principal coal-tar solvents were scarce despite the relatively low rate of activity in the automotive field. Call for benzol was off in the 1st half of the month but improved somewhat in the last half. Shortage of cresylic continued, but no further price advances were reported. Market for naphthalene was seasonally quiet (See page 352 this issue for a review of the present situation in cresylic and naphthalene). Creosote oil was steady; dyestuff intermediates were steady to firm in prices; colors were in good demand for leather and textiles. Coal-tar derivatives consumed in the plastics moved out in excellent volume.

Both production and stocks of coke increased during the month of August. The daily rate of output from byproduct and beehive plants amounted to 129,618 tons, indicating a gain of 4.4% over the July rate of 124,189 tons. This gain more than offset the loss of 2.0% suffered in July, and placed the trend of production on a level with that of July, '30, when an average of 129,100 tons per day was reported. The '36 accumulations to date are 29.6% above those of '35.

Demand for mixed goods so far this fall has been good in most sections. The mixers may resort to the use of several brandnames if the competitive situation becomes any worse. In most quarters in the industry there was considerable optimism that the proposed trade practice rules will finally correct most of the ills of the industry, but as it provides only for filing of past prices there is considerable disappointment.

Sulfuric Production by Fertilizer Co.'s

August production of sulfuric by 64 fertilizer manufacturers totalled 141,501 tons, compared with 121,166 in July and 123,209 tons in August of '35 and 97,478 tons in August of '34. Production for the 1st 8 months of the 3 respective periods: 1,082,409; 1,048,081, and 921,583 tons.

Output of byproduct coke for the month amounted to 3,865,802 tons, or 124,703 tons per day, an increase of 4.0% when compared with July recovery. Furnace plants made a gain of 4.6%, while at merchant plants production rose 2.4%. Output of beehive coke continued to increase, August production of 127,800 tons being 15.4% in excess of that of July.

Stock piles at byproduct plants at the close of August were 9.4% higher than at the beginning of the month, the bulk of the increase occurring at merchant plants. At the rate of production in August, stocks were sufficient to last 15.9 days, in comparison with 35.6 days' supply at the end of August, '35.

Vanadium Corp. of America has sold its Piney River, Nelson County, Virginia property consisting of the chemical plant unit of the Southern Mineral Products Corp., a subsidiary, to the Virginia Chemical Corp. Southern Mineral Products retains the most valuable part of its holdings consisting of mineral lands and mines. Company will supply the ore needs of Virginia Chemical as well as continuing to sell to the general market.

United States Production and Sales of Dyes by Classes of Application, 1935*

Class of application	Production		Sales			
	Quantity Pounds	Per cent. of total	Quantity Pounds	Per cent. of total	Quantity Pounds	Per cent. of total
Acid	14,593,749	14.32	14,168,009	14.46	11,077,102	21.51
Basic	5,389,058	5.29	4,974,882	5.08	4,338,892	8.43
Direct	26,073,439	25.57	25,087,369	25.61	13,147,875	25.54
Acetate silk	1,963,276	1.93	1,479,600	1.51	1,879,736	3.65
Lake and spirit-soluble	2,081,012	2.04	2,063,120	2.11	1,277,092	2.48
Mordant and chrome	6,264,133	6.14	6,398,849	6.44	3,041,479	5.91
Sulfur	16,949,143	16.63	17,009,957	17.36	3,798,351	7.38
Vats (including indigo)	27,908,296	27.38	26,180,465	26.73	12,272,209	23.81
(a) Indigo	13,614,238	13.36	14,051,451	14.35	2,452,243	4.76
(b) Other vats	14,294,058	14.02	12,129,014	12.38	9,819,966	19.07
Unclassified	710,555	.70	682,213	.70	655,625	1.27
Total	101,932,661	100.00	97,954,464	100.00	51,488,361	100.00

* Prepared by the U. S. Tariff Commission.

† Includes certain dyes not classed as acetate silk dyes in 1934.

Stock Values Rise \$603,135,325 in September

Movement in Most Groups is Mixed as the Domestic Political and Foreign Situations Cause Uncertainties to Develop—Several Important Chemical Companies Announce Higher Dividend Rates, Extras, and Payments on Accumulations—Allied Directors Fail to Increase Rate—

The stock market moved within very narrow limits through most of September and registered a net gain of \$603,135,325. On Sept. 1st there were 1,198 issues with a value of \$54,502,083,004, while on Oct. 1st 1,201 issues were listed on the board with a net value of \$55,105,218,329.

Movement in the chemical group was mixed. In the representative listings shown below the largest gain was a 4½ point rise in Du Pont. Texas Gulf Sulphur was off 3½ points, largely as a result of the unfavorable news concerning the possibility of higher sulfur taxes in Texas. In the last week of the month bills were offered in both houses of the legislature which would bring the present rate of 75c a ton up to the recently enacted \$2 a ton rate in Louisiana. In addition, exports are not making a very favorable showing but domestic tonnages are in good volume.

The N. Y. Evening Sun's compilation of 225 issues on the N. Y. Stock Exchange registered an appreciation of only 0.4% for the month, while 10 leading chemical common stocks gained \$12,084,174, a rise of 1%. On Oct. 1st the entire chemical group on the N. Y. Stock Exchange had a net value of \$6,059,914,088 and an average price of \$74.20.

Extras and increases in dividend rates continue to feature much of the financial news:—Penn. Salt has declared a quarterly dividend of \$1, an increase over the 75c rate maintained for the past few years. In each of the 2 preceding quarters, extras of \$1 were paid. So far this year company has declared dividends amounting to \$5.25 a share, including the current distribution. Earnings for 12 months ending June 30th amounted to \$1,285,645, or \$8.57 a share on the capital stock outstanding.

Air Reduction has declared a \$1 extra, plus the regular quarterly one of 25c; General Printing Ink has declared a \$1 dividend; Pratt & Lambert has increased the quarterly rate from 25c to 50c;

Sherwin-Williams of Canada has declared a \$1.75 dividend on the preferred on account of accumulations; Borne Scrymser has declared a special dividend of 75c; Hooker Electrochemical paid \$1.50 a share on account of accumulations on the 6% preferred stock on Sept. 30th, leaving arrears now at \$7.50 a share. One discordant note was reported, suspension of dividends by Chickasha Cotton Oil.

Westvaco Chlorine has voted an initial dividend of 25c a share on the new 5% preferred, payable on Nov. 1st. This payment is for the months of September and October.

Chemical Financial News of the Month

Highlights of the chemical financial news of the past month:—Earnings of over \$2.50 a share for '36 are expected for Air Reduction; American Agricultural Chemical will retire 13,305 shares of capital stock now in the treasury; N. Y. Stock Exchange has admitted to the list Lautaro's certificates of deposit for 6% bonds due in '54; elimination of \$38,000 of bonds of the Chemical & Pigment Co., a subsidiary, will free the Glidden balance sheet of all funded debt. Glidden's July profit was \$206,729, as against but \$93,190 in the corresponding period of last year.

Allied was in good demand last month and enjoyed a good price rise. Many in the Street were hoping for more than the usual dividend when the directors met late in the month but no extra was forthcoming. Feeling in the Street, however, is that some such action will be taken before the end of the year. The company is said to be enjoying the best year since the depression started and probably '36 earnings will approximate \$12 a share.

Vanadium Nets 11c a Share

Vanadium Corporation of America reported net income for the half year of \$41,838, or 11c a share. This compares with a net loss in the like period of last year of \$270,181.

Price Trend of Chemical Company Stocks

	Aug. 31	Sept. 4	Sept. 11	Sept. 18	Sept. 25	Sept. 30	Net gain or loss last month	Price on Sept. 30, 1935	1936	
									High	Low
Air Reduction	73½	74¾	76½	76	76	74½	+ ½	149*	81¾	58
Allied Chemical	226	229½	226	227	221	224	-2	170	245	157
Columbian Carbon	122½	126	127¾	...	121½	124½	+2½	89	136½	94
Com. Solvents	16½	16¾	15½	15½	15½	15½	-1½	18¾	24¾	14¾
du Pont	157	156¾	162½	129¾	129¾	161½	+4½	128¾	167¾	133
Hercules Powder	113¾	116	116	...	112	113¾	.....	86¾	116½	84
Mathieson	35¾	35	35	34¾	34¾	35¾	.....	31	37¾	27¾
Monsanto	100½	98½	98	97½	99½	98½	-2	82½	103	79
Std. of N. J.	62½	61½	62½	61¾	61	60¾	-2½	43	70	51½
Texas Gulf S.	38¾	38	37½	37¾	35	35¾	-3½	31¾	39¾	33
Union Carbide	95¾	96¾	96¾	96½	96¾	97	+1¾	67¾	100	71¾
U. S. I.	34¾	34¾	33¾	34	33¾	34¾	-½	45	59	31¾

* Old stock; ‡ New high; † Aug. 27th price.

Dividends and Dates

Name	Div.	Stock Record	Payable
Air Reduction, ext.	\$1.00	Sept. 30	Oct. 15
Air Reduction ...	25c	Sept. 30	Oct. 15
Amer. Agr. Chem.	75c	Sept. 14	Sept. 30
Am. Cyan., A and B	15c	Sept. 15	Oct. 1
Am. Enka	25c	Sept. 15	Oct. 1
Am. Hard Rub., pf.	\$2.00	Sept. 16	Oct. 1
Am. Maize Prod., pf.	25c	Sept. 24	Sept. 30
Am. Maize Prod., pf.	\$1.75	Sept. 24	Sept. 30
Am. Smelt. & Ref., 1st pf.	50c	Nov. 6	Nov. 30
Am. Smelt. & Ref., 1st pf.	\$1.50	Oct. 9	Oct. 31
Am. Smelt. & Ref., 2nd	\$1.75	Oct. 9	Oct. 31
Bon Ami, Class A	\$1.00	Oct. 15	Oct. 30
Bon Ami, Class B	50c	Sept. 18	Oct. 1
Borne Scrymser, sp.	75c	Sept. 25	Oct. 15
California Ink, ext.	12½c	Sept. 21	Oct. 1
California Ink ...	50c	Sept. 21	Oct. 1
Canadian Celanese, 7% part. pf.	40c	Sept. 18	Sept. 30
Canadian Celanese, 7% part. pf.	\$1.75	Sept. 18	Sept. 30
Canadian Indust., Cl. A	\$1.25	Sept. 30	Oct. 31
Canadian Indust., Cl. B	\$1.25	Sept. 30	Oct. 31
Canadian Indust., pf.	\$1.75	Sept. 30	Oct. 15
Celanese, 7% pr. ....	.....	.....	.....
pf.	\$1.75	Sept. 18	Oct. 1
Certain-teed, 6% pf., int.	\$1.50	Sept. 19	Oct. 1
Champion Paper, 6% pf.	\$1.50	Sept. 15	Oct. 1
Climax Molybdenum	20c	Sept. 12	Sept. 30
Clorox Chemical..	50c	Sept. 16	Oct. 1
Colgate-Palmolive-Peet, pf.	\$1.50	Sept. 5	Oct. 1
Cons. Chem. Ind., Cl. A	37½c	Oct. 15	Nov. 1
Cons. Chem. Ind., Cl. B	37½c	Oct. 15	Nov. 1
Coronet Phos.	\$1.00	Sept. 21	Oct. 1
Devoe & Reynolds, A, B	50c	Sept. 19	Oct. 1
Devoe & Reynolds, pf.	\$1.75	Sept. 19	Oct. 1
du Pont, deb.	\$1.50	Sept. 9	Oct. 24
Fansteel Met., pf.	\$1.25	Sept. 15	Sept. 30
Fansteel Met., pf.	\$1.25	Dec. 15	Dec. 31
Formica Insul.	20c	Sept. 15	Oct. 1
Freeport Texas Co., pf.	\$1.50	Oct. 15	Nov. 2
Gen. Print. Ink.	\$1.00	Sept. 21	Oct. 1
Gen. Print. Ink, pf.	\$1.50	Sept. 21	Oct. 1
Glidden	25c	Oct. 3	Oct. 20
Glidden, conv. pf. int.	56½c	Sept. 17	Oct. 1
Gold Dust	15c	Oct. 10	Nov. 2
Heyden Chem., pf.	\$1.75	Sept. 22	Oct. 1
Im. Chem. Indus.	Interim 2½%	.....	.....
Ind. Rayon	42c	Sept. 24	Oct. 1
Int'l Nickel	35c	Aug. 31	Sept. 30
Int'l Nickel, pf.	\$1.75	Oct. 3	Nov. 2
Int'l Salt	37½c	Sept. 15	Oct. 1
Koppers Gas & Coke, 6%, pf.	\$1.50	Sept. 12	Oct. 1
Mathieson Alkali ..	37½c	Sept. 8	Sept. 30
Mathieson Alkali, pf.	\$1.75	Sept. 8	Sept. 30
Merck	20c	Sept. 21	Oct. 1
Merck, pf.	\$1.50	Sept. 21	Oct. 1
Monroe Chem.	25c	Sept. 15	Oct. 1
Monroe Chem., pf.	87½c	Sept. 15	Oct. 1
Nat'l Lead ext.	12½c	Sept. 11	Sept. 30
Nat'l Lead	12½c	Sept. 11	Sept. 30
Nat'l Lead, Cl. B, pf.	\$1.50	Oct. 16	Nov. 2
Nat'l Oil Products, ext.	20c	Sept. 21	Sept. 30
Nat'l Oil Prods., SA	30c	Sept. 21	Sept. 30
Penn. Salt Mfg.	\$1.00	Sept. 30	Oct. 15
Pittsburgh Plate Glass	\$1.50	Sept. 10	Oct. 1
Pratt & Lambert ..	50c	Sept. 16	Oct. 1
P. & G., 8% pf.	\$2.00	Sept. 26	Oct. 15
Sherwin-Wms., Ltd. pf. Ac	\$1.75	Sept. 15	Oct. 1
Spencer, Kellogg ..	40c	Sept. 15	Sept. 30
Std. Whole. Phos. & Acid	30c	Sept. 15	Sept. 30
Swan Finch, 7% ..	43¾c	Sept. 24	Oct. 1
Union Carbide ...	70c	Sept. 4	Oct. 1
United Carbon	75c	Sept. 14	Oct. 1
United Dyewood, pf.	\$1.75	Sept. 11	Oct. 1
United Dyewood, pf.	\$1.75	Dec. 11	Jan. 1 '37
United Dyewood ..	25c	Sept. 11	Oct. 1
Will & Baumer ...	10c	Nov. 2	Nov. 15
Will & Baumer, pf.	\$2.00	Sept. 15	Oct. 1
J. S. Young	\$1.50	Sept. 18	Oct. 1
J. S. Young, pf.	\$1.75	Sept. 18	Oct. 1

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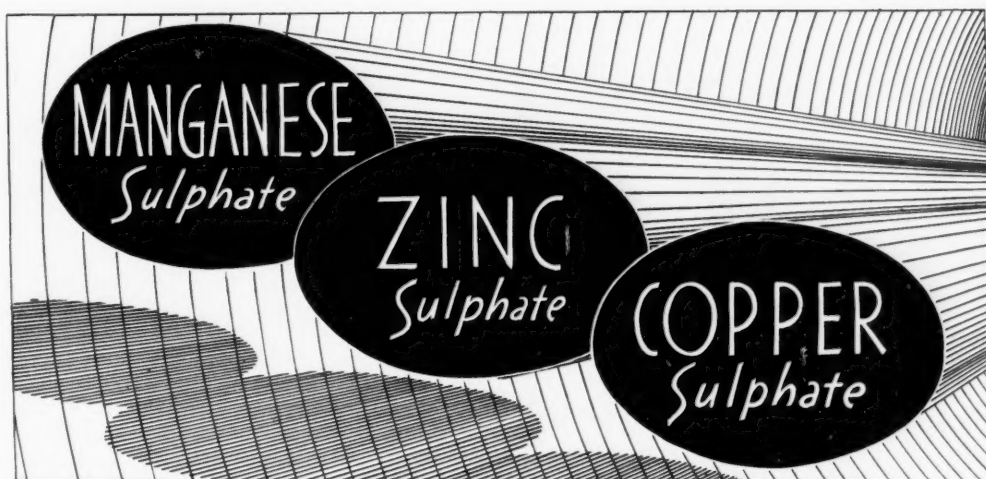
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Chemical Stocks and Bonds

1936 September												1935		1934		Sales	Stocks	Par \$	Shares Listed	An. Rate*	Earnings		
Last	High	Low	High	Low	High	Low	High	Low	High	Low	1935	1934											
NEW YORK STOCK EXCHANGE												Number of shares Sept. 1936 1935											
74 1/4	81 3/4	58	57 1/2	35	37 1/2	30 1/2	27,700	237,700	Air Reduction	No	2,523,864	\$1.50	2.10	1.66									
224	245	157	173	125	160 3/4	115 1/2	9,900	271,600	Allied Chem. & Dye	No	2,214,099	6.00	8.71	6.83									
60 1/2	63 1/4	49	57 3/4	41 1/2	48	25 1/4	7,100	89,700	Amer. Agric. Chem.	100	315,701	2.00	p6.37	p6.37									
28	32 3/8	20 1/2	35 3/4	22 1/2	26 1/2	20 3/4	27,100	260,400	Amer. Com. Alcohol	20	260,716	None	3.16	3.57									
39 3/4	50	37	52	36	39 1/2	26 1/4	3,900	62,800	Archer-Dan-Midland	No	541,546	1.50	p4.21	p4.21									
67	73	48	48 1/2	32 3/4	55 1/2	35 1/4	3,100	46,700	Atlas Powder Co.	No	234,235	2.25	2.81	2.49									
121	126 1/4	112	115	106 3/4	106 3/4	83	260	5,000	6% cum. pfd.	100	88,781	6.00	16.93	13.54									
25 3/4	32 1/4	21 3/4	35 3/8	19 1/2	44 7/8	17 1/2	89,000	762,900	Celanese Corp. Amer.	No	987,800	.50	1.99	1.25									
15 1/4	20 1/2	13	21	15 1/8	18 1/2	9 3/4	58,200	530,800	Colgate-Palm-Peet	No	1,985,812	.75	1.36	1.16									
104 1/4	106 1/2	100	107 1/4	101	102 1/2	68 1/2	800	18,100	6% pfd.	100	254,500	6.00	16.79	16.14									
124 1/2	136 1/2	94	101 1/4	67	77 1/4	58	3,300	100,600	Columbian Carbon	No	538,154	4.50	5.56	3.93									
15 1/2	24 3/8	14 1/4	23 7/8	16 1/2	36 3/4	15 3/4	63,700	1,672,400	Commer. Solvents	No	2,635,371	.60	1.02	.89									
69 1/2	82 1/2	63 1/2	78 3/8	60	84 1/2	55 1/2	35,800	367,700	Corn Products	25	2,530,000	3.00	2.62	3.16									
160 1/2	168 1/2	158	165	148 1/4	150 1/2	135	700	7,700	7% cum. pfd.	100	243,739	7.00	33.97	39.65									
52	58 1/4	42	50 3/8	35 1/2	55 1/4	29	1,000	43,000	Devoe & Rayn. A.	No	95,000	2.00	2.89	2.36									
161 7/8	167 3/4	133	146 1/2	86 3/8	103 7/8	80	33,700	380,700	DuPont de Nemours	20	10,871,997	5.00	5.04	3.63									
130	133 1/2	129	132	126 7/8	128 1/2	115	2,900	26,700	6% cum. deb.	100	1,092,699	6.00	56.94	42.73									
169 1/4	185	156	172 1/4	110 1/2	116 1/2	79	6,200	94,000	Eastman Kodak	No	2,250,921	6.00	6.90	6.28									
163 1/2	166	152	164	141	147	120	170	3,430	6% cum. pfd.	100	61,657	6.00	258.09	235.22									
25	35 3/8	23 1/2	30 3/8	17 1/4	50 3/8	21 1/2	25,200	307,400	Freeport Texas	10	784,664	1.00	1.78	1.76									
120	135	118 1/2	125	112 1/2	160 1/2	113 1/2	20	1,510	6% conv. pfd.	100	25,000	6.00	121.30	120.08									
43	55 1/4	39 3/4	49 1/2	23 3/8	28 3/8	15 3/8	24,600	290,700	Glidden Co.	No	603,304	2.00	.....	2.91								
53	55	52 1/4	53 1/2	49 1/2	52 1/2	49 1/2	2,800	25,260	4 1/2% cum. pfd.	50	200,000	2.25	.....	.....							
104	133	102	119 1/2	85	96 7/8	74	2,100	16,100	Hazel Atlas	25	434,409	5.00	7.58	5.21									
113 3/4	116	84	90	71	81 3/8	59	1,500	41,300	Hercules Powder	No	582,679	5.00	4.23	3.94									
130	135	126	131	122	125 3/4	111	510	3,260	7% cum. pfd.	100	105,765	7.00	36.30	28.79									
33 3/8	36	25 3/8	36 3/8	23 1/2	32	19 3/4	51,400	369,200	Industrial Rayon	No	600,000	1.68	1.00	2.23									
3 1/8	5 7/8	2 1/2	5	2 3/8	6 1/2	2	7,900	291,800	Intern. Agricul.	No	436,049	None	.....	p-99								
27	41	22 3/4	42 3/4	26	37 1/4	15	3,200	58,600	7% cum. pr. pfd.	100	100,000	None	.....	p2.66								
61 1/2	62 3/4	43 1/4	47 1/4	22 3/4	29 1/4	21	24,900	1,834,700	Intern. Nickel	No	14,584,025	1.25	1.65	1.14									
25 3/8	29 3/8	23	36 3/4	25	32	21	1,100	29,400	Intern. Salt	No	240,000	1.50	1.32	2.02									
32 1/2	36 3/4	29 3/4	36 3/4	31	33 1/2	15 3/4	1,700	22,000	Kellogg (Spencer)	No	500,000	1.60	.....	v2.22								
67 1/8	71	47 1/4	49 1/4	21 1/2	43 7/8	22 1/2	43,300	535,100	Libbey Owens Ford	No	2,559,042	2.00	3.26	1.25									
40 1/4	44 1/4	32 1/2	37 1/4	24 1/2	35 3/8	16 1/2	13,300	152,000	Liquid Carbonic	No	342,406	1.60	23.06	1.96									
35 3/4	37 1/2	27 1/2	33 7/8	23 3/4	40 3/4	23 1/2	15,300	261,900	Matheson Alkali	No	650,436	1.50	1.44	1.20									
98 1/2	103	79	94 3/4	55	61 3/8	39	6,500	135,800	Monsanto Chem.	10	864,000	1.50	3.84	3.03									
27 3/8	31 3/8	26 3/8	28 3/8	14 1/2	17	13 1/2	27,000	158,300	National Lead	10	3,098,310	.50	1.08	.84									
165	168	158	162 1/2	150	146 1/2	122	.....	1,800	7% cum. "A" pfd.	100	243,676	7.00	25.40	20.12								
140	144	137 3/4	140 1/2	121 1/2	121 1/2	100 1/2	160	3,070	6% cum. "B" pfd.	100	103,277	6.00	49.05	35.36									
14 1/4	16 1/2	9	10 7/8	4 3/8	13	5 1/2	78,400	879,900	Newport Industries	1	519,347	None	.57	.31									
140	164	128	129	80	94	60	5,900	106,800	Owens-Illinois Glass	25	1,200,000	5.00	6.52	5.41									
45 3/4	49	40 1/4	53 3/4	42 3/8	44 3/8	33 1/2	13,500	213,700	Procter & Gamble	No	6,410,000	1.75	.....	p 2.23								
118 1/2	122 1/2	117 3/4	121	115	117	102 1/2	370	3,500	5% pfd. (ser. 2-1-29)	100	171,569	5.00	.....	p88.13								
7	10 1/4	5 1/2	8 3/4	4	6 3/4	3 1/2	21,300	404,300	Tenn. Corp.	5	857,896	None	.22	.27									
35 3/4	39 3/8	33	36 3/4	28 3/4	43 1/4	30	27,000	321,800	Texas Gulf Sulphur	No	2,540,000	2.00	1.94	1.81									
97	100	71 3/8	75 3/4	44	50 7/8	35 7/8	47,200	631,200	Union Carbide & Carbon	No	9,000,743	2.40	3.06	2.28									
88	89 1/4	68	78	46	50 3/8	35	2,800	109,100	United Carbon	No	370,127	2.40	4.71	3.55									
34 1/2	59	31 1/4	50 3/8	35 1/2	64 3/4	32	25,200	411,100	U. S. Indus. Alco.	No	391,033	1.00	2.16	4.04									
23 1/2	27 1/4	16 1/4	21 3/4	11 1/4	31 3/4	14	57,900	422,800	Vanadium Corp.-Amer.	No	366,637	None	-1.13	-2.29									
4 7/8	8 3/8	4 1/8	4 7/8	2 1/2	5 3/8	1 7/8	7,500	348,100	Virginia-Caro. Chem.	No	486,000	None	.....	p-79								
33 1/2	48 3/4	28 3/4	35 3/4	17 1/2	26	10	7,000	225,200	6% cum. part. pfd.	100	213,392	None	.....	p4.20								
26	32	19 3/4	25 1/2	16 3/4	27 1/4	14 7/8	6,500	127,400	Westvac Chlorine	No	284,962	.50	1.63	1.55									
NEW YORK CURB EXCHANGE																							
33 1/4	40 3/4	29 1/4	30	15	22 1/2	14 3/4	50,100	454,100	Amer. Cyanamid "B"	No	2,404,194	.60	1.61	.99									
2 3/4	3 3/4	2 1/2	4	2	4 1/2	2 3/8	600	9,900	British Celanese Am. R.	10	2,806,000	None	-71%	-58%									
102	116 1/4	99 1/4	115	90	105 1/4	81	1,100	1,070	Celanese, 7% cum. 1st pfd.	100	144,379	7.00	21.96	16.37									
106 1/2	116	107 1/4	111 1/4	97 1/2	102	83	450	6,775	7% cum. prior pfd.	100	213,668	7.00	35.34	28.13									
11	16 1/2	9	15	7	19	7	600	6,050	Celluloid Corp.	15	194,952	None	-.95	-1.67									
13 1/2	15	11 7/8	14 1/2	11 1/2	14 3/8	10 1/2	400	4,600	Courtaulds Ltd.	1 £	24,000,000	7 1/2%	7.51%	7.57%									
117	124 3/4	94 3/4	105 1/2	80 1/2	91	67 1/2	3,300	52,000	Dow Chemical	No	945,000	2.40	4.42	3.32									
6 3/8	10 3/4	5	12 1/2	6 1/4	10 3/4	4	6,400	89,600	Duval Texas Sulphur	No	500,000	None	.16	.25									
42	55	42	58	37	40 3/4	19	500	6,700	Heyden Chem. Corp.	10	147,600	1.25	3.22	3.20									
133	140	98 1/4	97 1/4	46 3/4	57 1/2	39	4,500	60,040	Pittsburgh Plate Glass	25	2,141,305	4.00	5.32	2.69									
133 1/4	145 1/2	117	128 7/8	84	90 1/2	47 1/4	3,500	59,550	Sherwin Williams	25	635,583	4.00	.....	y6.19								
111	116	110	113 1/2	106	109 3/4	100	250	4,380	5% pfd. cum.	100	155,521	5.00	.....	y33.17								
PHILADELPHIA STOCK EXCHANGE																							
142	150	114 1/4	116 1/4	76 1/2	75	50 1/4	385	2,700	Pennsylvania Salt	50	150,000	5.00	v8.57	v5.99									

Industrial Trends

Business Activity Expands Seasonally—Retail and Wholesale Trade Ahead by 10-15%—Steel at New 6-Year High—Chemical Consumption Heavy—Trade Awaits '37 Prices—

Business continued to go forward in September, the 3rd week of the month showing a new high in trade activity for the year. The N. Y. Journal of Commerce index of business activity rose in that week to 96.5 owing to sharp advances in carloadings, electric output, steel production and automotive production.

Retail trade in most cities throughout the country averaged 10 to 17% over the same period of last year, while the national average rise in wholesale trade was about 10 to 15%. Retail and wholesale buying shows no indication of slackening the brisk pace that has kept production in many lines near capacity points, and department store buyers are anticipating 10 to 15% sales increases for the balance of the year over the figures for the 4th quarter of '35.

Steel activity at 73.5% of capacity is a new high for the past 6 years. A minimum amount of time was taken by the automotive manufacturers in changing over to the '37 models and the assembly lines are again rushed. Sales of cars and trucks over the balance of the year are expected to exceed last year's 4th quarter by about 10%.

Carloadings so far are ahead of last year by 12.9%. Railroad statisticians are

confident that a peak of 800,000 or better will be recorded this year. Seasonal trend is toward higher levels in the next month and there is a strong possibility that the peak car loadings statement will be witnessed sometime in October. Electrical consumption continues to show remarkable gains over the corresponding periods of '35.

Improvement Is General

The steel and automobile industries are not enjoying any monopoly on general improvement. Paper production this year is likely to reach a larger volume than was produced in '29. Several substantial additions to existing rayon manufacturing facilities have been announced. Nevertheless, consumers face an acute shortage of artificial silk this fall. Other branches of the textile field are seasonally busy, even natural silk which is of course, now being aided by the tight situation in rayon. After a rather poor start in the 1st half of the year the shoe manufacturers are likely to exceed '35 production which was the best year in the history of the industry. Tanners are taking much larger commitments of hides and are much firmer in their price ideas. The glass industry, aided by sensational growth in the use of safety glass, by the belated but

very welcome revival in the building field, and the development of new uses for glass, is reasonably expecting its best year since '29 and may even exceed that year's total. Rubber consumption is being maintained at very high figures month after month despite the labor uncertainties that beset that field, particularly in the Akron area. The usual fall seasonal rise in paint sales is now in full swing and the total volume at the end of the year is expected to easily fulfill the expectations voiced by the industry's leaders at the close of '35.

Commodity prices continue to rise with the grains (particularly corn), cotton, and the metals pointing the way. Compared with a year ago, industrial commodity prices are 2.1% higher, according to the statistics of the Bureau of Labor.

Chemical Shipments Satisfactory

With practically all of the industries that are heavy chemical consumers operating at record or close to record proportions, it is not difficult to surmise that chemical production and sales are highly satisfactory. A noticeable pick-up in volume was reported immediately following the Labor Day period and there is every reason to believe that October chemical consumption will exceed that for any previous month so far this year.

Contract prices for '37 are likely to be late, largely because of the uncertainty over the Robinson-Patman Act and the outcome of the presidential election. Further, most chemical executives agree that the shorter the contract season the more stable the prices generally are.

Foreign Situation Unsettles Some Items

The unsettled political and financial situations abroad are affecting the markets for several items. The Civil War in Spain is largely responsible for the precipitous rise in mercury and the mercurials. Importers of Spanish oxides and ochres are still filling their regular customers' needs from local stocks, but unless a definite conclusion is soon reached the paint field will be in a bad way for supplies.

Gains Despite Adverse Influences

It is truly remarkable that industrial activity remains at such a high level in the midst of a very bitter political campaign. But one conclusion can be drawn and that is that the tremendous backlog built up over the past 6 years refuses to be held in check any longer by adverse influences.

Statistics of Business

	August 1936	August 1935	July 1936	July 1935	June 1936	June 1935
Automotive production	271,291	237,400	440,999	332,109	454,487	356,340
Bldg. contracts*†	\$275,281	\$168,557	\$294,834	\$159,258	\$233,055	\$148,005
Failures, Dun & Bradstreet	655	884	639	902	733	944
Merchandise imports‡	\$195,016	\$169,030	\$193,622	\$176,631	\$192,233	\$156,754
Merchandise exports‡	\$178,249	\$172,128	\$178,324	\$173,230	\$185,188	\$170,244
Newsprint Production						
Canada, tons	270,053	235,573	274,627	234,266	270,051	232,020
U. S., tons	73,673	75,187	73,361	73,108	79,830	77,339
Newfoundland, tons	29,301	29,565	29,246	29,336	27,980	27,559
Plate glass prod., sq. ft. ....	.....	.....	16,427,849	13,908,529	16,243,665	13,162,515
Steel ingots production, tons	4,195,130	2,915,930	3,922,000	2,267,000	3,984,845	2,258,664
Steel activity, % capacity	73.52	48.78	68.74	39.40	69.83	40.81
Pig iron production, tons	2,711,721	1,761,286	2,594,000	1,520,000	2,586,240	1,552,514
U. S. consumption, crude rubber, tons	46,657	38,775	48,127	35,917	52,636	36,623
Tire shipments .....	.....	.....	5,743,863	5,447,109	5,792,319	4,262,360
Tire production .....	.....	.....	5,464,927	5,531,834	5,609,789	3,909,832
Tire inventory .....	.....	.....	7,746,388	8,849,503	7,832,911	10,755,400
Dept. of Labor Indices†						
Factory payrolls, totals‡	81.0	69.6	77.8	78.7	79.5	66.4
Factory employment‡	88.7	81.8	87.7	86.3	86.0	79.7
Chemical employment‡a	115.9	107.7	115.3	109.0	111.7	106.4
Chemical payrolls‡a	113.0	110.5	103.7	95.4	108.9	98.0
Chemicals and Related Products						
Exports‡	\$9,186	\$9,375	\$9,081	\$8,138	\$8,138	\$9,081
Imports‡	\$5,333	\$3,767	\$5,752	\$4,656	\$4,656	\$5,752
Stocks, mfg. goods .....	.....	.....	115	117	121	117
Stocks, raw materials .....	.....	.....	69	78	71	81
Anthracite shipments, tons	2,917,377	2,393,145	3,345,309	3,031,987	3,515,878	4,878,783
Bituminous prod., tons	32,818,000	26,164,000	32,054,000	22,252,000	29,415,000	30,117,000
Boot and shoe production	40,860,584	37,243,414	34,867,859	32,274,469	29,006,845	26,485,329

Week Ending	Carloadings			Electrical Output§			Jour. of Com. Price Index	National Chem. & Drugs	Fats & Oils	Fert. Mat.	Fertilizer Association Indices			Chem. & Drug Price Index	% Steel Activity	N. Y. Times Fisher's Index	
	1936	1935	% Change	1936	1935	% Change					Mixed Fert.	All Fert. Groups	Price Index			Bus. Act.	Pur. Power
Aug. 29	753,742	680,848	+10.7	2,135,598	1,809,716	+18.0	81.2	95.1	79.9	67.3	73.7	79.7	80.3	71.5	102.8	119.3	
Sept. 5	764,680	591,941	+29.2	2,098,928	1,752,066	+19.8	82.3	95.1	79.9	67.3	73.7	79.7	80.5	68.2	101.9	119.5	
Sept. 12	699,859	699,786	0.0	2,028,583	1,827,513	+11.0	82.9	95.1	83.7	67.5	73.7	80.4	81.5	72.5	101.7	118.7	
Sept. 19	789,510	706,820	+11.7	2,170,807	1,851,541	+17.2	82.1	95.1	81.0	67.4	74.0	80.5	81.5	74.4	102.1	118.9	
Sept. 26	807,070	629,835	+28.1	2,157,278	1,857,470	+16.1	81.6	95.1	80.2	67.4	74.0	80.0	81.8	...	102.7	119.0	

* '37 states; † Dept. of Labor, 3 year average, 1923-1925 = 100.0; ‡ 000 omitted; § K.W.H., 000 omitted; a Includes all allied products but not petroleum refining; †† 1926-1928 = 100.0; y Preliminary; z Revised.

Prices Current

Chemical prices quoted are of American manufacturers for spot New York, immediate shipment, unless otherwise specified. Products sold f. o. b. works are specified as such. Import chemicals are so designated. Resale stocks when a market factor are quoted in addition to maker's prices and indicated "second hands."

Oils are quoted spot New York, ex-dock. Quotations

Purchasing Power of the Dollar: 1926 Average—\$1.00 - 1935 Average \$1.21 - Jan. 1936 \$1.19 - Sept. 1936 \$1.19

	Current Market	1936 Low	1936 High	1935 Low	1935 High
Acetaldehyde, drs, c-l, wgs lb. ...	.14	...	.14	...	.14
Acetalol, 95%, 50 gal drs					
wks ...	.21	.25	.21	.25	.21
Acetamide, tech, lcl, kegs lb. ...	.38	.43	.38	.43	.38
Acetanilid, tech, 150 lb bbls lb. ...	.24	.26	.24	.26	.24
Acetic Anhydride, 100 lb chys lb. ...	.21	.25	.21	.25	.21
drs, f.o.b. wks, frt					
allowed ...	.15	...	...	...	...
Acetin, tech, drs ...	.22	.24	.22	.24	.22
Acetone, tks, f.o.b. wks, frt allowed ...	.07	.07	.12	.11	.12
drs, c-l, f.o.b. wks, frt allowed ...	.08	.08	.12	...	.12
Acetyl chloride, 100 lb chys lb. ...	.55	.68	.55	.68	.55
ACIDS					
Abietic, kgs, bbls ...	.06 3/4	.07	.06 3/4	.07	.06 3/4
Acetic, 28%, 400 lb bbls, c-l, wks ...	2.45	...	2.45	2.40	2.45
glacial, bbls, c-l, wks 100 lbs. ...	8.43	...	8.43	8.25	8.43
glacial, USP, bbls, c-l, wks ...	12.43	...	12.43	12.25	12.43
Adipic, kgs, bbls ...	.72	...	.72	...	.72
Anthranilic, retd, bbls ...	.85	.95	.85	.95	.85
tech, bbls ...	.75	...	.75	...	.75
Battery, chys, delv ...	1.60	2.25	1.60	2.25	1.60
Benzoic, tech, 100 lb kgs lb. ...	.40	.45	.40	.45	.40
USP, 100 lb kgs ...	.54	.59	.54	.59	.54
Boric, tech, gran, 80 tons, bga, delv ...	95.00	...	95.00	80.00	95.00
Broenner's, bbls ...	1.20	1.25	1.20	1.25	1.20
Butyric, 95%, chys ...	.53	.60	.53	.60	.53
edible, c-l, wks, chys ...	1.20	1.30	1.20	1.30	1.20
synthetic, c-l, drs ...	.22	...	.22	...	.22
wks ...	.23	...	.23	...	.23
tks, wks ...	.21	...	.21	...	.21
Camphoric, drs ...	5.25	...	5.25	...	5.25
Chicago, bbls ...	2.10	...	2.10	...	2.10
Chlorosulfonic, 1500 lb drs, wks ...	.03 3/4	.05	.03 3/4	.05	.03 3/4
Chromic, 99 3/4%, drs, delv lb. ...	.14 3/4	.16 3/4	.14 3/4	.16 3/4	.14 3/4
Citric, USP, crys, 230 lb bbls ...	.26	.27	.26	.29	.29
anhyd, gran, bbls ...	.29	.29	.31	...	.31
Cleve's, 250 lb bbls ...	.52	.54	.52	.54	.52
Cresylic, 99%, straw, HB, drs, wks, frt equal ...	.63	.65	.51	.65	.46
99%, straw, LB, drs, wks, frt equal ...	.73	.75	.68	.75	.64
resin grade, drs, wks, frt equal ...	.63	.65	.52	.65	.52
Crotonic, drs ...	.90	1.00	.90	1.00	.90
Formic, tech, 140 lb drs ...	.11	.13	.11	.13	.11
Fumaric, bbls ...	.60	...	.60	...	.60
Fuming, see Sulfuric (Oleum)					
Fluoric, tech, 90%, 100 lb drs lb. ...	.35	...	.35	...	.35
Gallie, tech, bbls ...	.65	.68	.65	.68	.65
USP, bbls ...	.70	.80	.70	.80	.70
Gamma, 225 lb bbls, wks lb. ...	.80	.84	.80	.84	.77
H, 225 lb bbls, wks ...	.50	.55	.50	.55	.50
Hydriodic, USP, 10% sol. chys ...	.50	.51	.50	.51	.50
Hydrobromic, 48% com 155 lb chys, wks ...	.45	.48	.45	.48	.45
Hydrochloric, see muriatic					
Hydrocyanic, cyl, wks ...	.80	1.30	.80	1.30	.80
Hydrofluoric, 30%, 400 lb bbls, wks ...	.07	.07 1/2	.07	.07 1/2	.07
Hydrofluosilicic, 35%, 400 lb bbls, wks ...	.11	.12	.11	.12	.11
Lactic, 22%, dark, 500 lb bbls lb. ...	.04 1/4	.05	.04 1/4	.05	.04 1/4
22%, light retd, bbls ...	.06 1/4	.07	.06 1/4	.07	.06 1/4
44%, light, 500 lb bbls ...	.11 1/4	.12	.11 1/4	.12	.11 1/4
44%, dark, 500 lb bbls ...	.09 1/4	.10	.09 1/4	.10	.09 1/4
50%, water white, 500 lb bbls ...	.14 1/4	...	.14 1/4	...	...
USP X, 85%, chys ...	.45	.50	.45	.50	.45
Laurent's, 250 lb bbls ...	.46	.47	.46	.47	.36
Linoleic, bbls ...	.16	.16	.16	.16	.16
Maleic, powd, kgs ...	.29	.32	.29	.32	.29
Malic, powd, kgs ...	.45	.60	.45	.60	.45
Metanilic, 250 lb bbls ...	.60	.65	.60	.65	.60
Mixed, tks, wks ...	.06 1/4	.07 1/4	.06 1/4	.07 1/4	.06 1/4
N unit	.008	.009	.008	.009	.008
Monochloroacetic, tech, bbls lb. ...	.16	.18	.16	.18	.16
Monosulfonic, bbls ...	1.50	1.60	1.50	1.60	1.50
ALCOHOLS					
Alcohol, Amyl (from Pentane) tks, delv ...	.143	...	.143	...	...
c-l, drs, delv ...	.150	...	.150	...	...
lcl, drs, delv ...	.157	...	.157	...	...
Amyl, secondary, tks, delv ...	.108	...	.108	...	.108
Benzyl, bottles ...	.65	1.10	.65	1.10	.65
Butyl, normal, tks, f.o.b. wks, frt allowed ...	.08 1/2	.08 1/2	.11	.11	.12
c-l, drs, f.o.b. wks, frt allowed ...	.09 1/2	.09 1/2	.12	.12	.13
Butyl, secondary, tks, delv ...	.07 1/2	.07 1/2	.096	...	.096
c-l, drs, delv ...	.08 1/2	.08 1/2	.106	...	.106
Capryl, drs, tech, wks ...	.85	...	.85	...	.85
Cinnamic, bottles ...	3.25	3.65	3.25	3.65	3.25
Denatured, CD, No. 11, 12, 13, tks, c-l, drs, wks gal. e	.34	.34	.44*	.34	.49*
Western schedule, c-l, wks ...	.39	.39	.52*	.38	.52*
Denatured, SD, No. 1, tks, c-l, tks ...	.26	.23	.28	.29 1/2	.31
c-l, drs, wks, gal. e	.29	.29	.34	.34 1/2	.36
Diacetone, tech, tks, delv lb. f	.16	...	.16	...	.16
c-l, drs, delv ...	.17	...	.17	...	.17

Heavy Chemicals, Coal-tar Products, Dye-and-Tan-stuffs, Colors and Pigments, Fillers and Sizes, Fertilizer and Insecticide Materials, Petroleum Solvents and Chemicals, Naval Stores, Fats and Oils, etc.

f. o. b. mills, or for spot goods at the Pacific Coast are so designated.

Raw materials are quoted New York, f. o. b., or ex-dock. Materials sold f. o. b. works or delivered are so designated.

The current range is not "bid and asked," but are prices from different sellers, based on varying grades or quantities or both. Containers named are the original packages most commonly used.

	Current Market	1936 Low	1936 High	1935 Low	1935 High
Muriatic, 18°, 120 lb chys, c-l, wks ...	1.35	...	1.35	...	1.35
tks, wks ...	1.00	...	1.00	...	1.00
20°, chys, c-l, wks ...	1.45	...	1.45	...	1.45
tks, wks ...	1.20	...	1.20	...	1.20
22°, c-l, chys, wks ...	1.95	...	1.95	...	1.95
tks, wks ...	1.60	...	1.60	...	1.60
CP, chys ...	.06 1/4	.07 1/4	.06 1/4	.07 1/4	.06 1/4
N & W, 250 lb bbls ...	.85	.87	.85	.87	.85
Naphthene, 240-280 s.v., drs lb. ...	.11	.14	.11	.14	.11
Sludges, drs ...	.06	.10	.06	.10	...
Naphthionic, tech, 250 lb bbls ...	.60	.65	.60	.65	.60
Nitric, 36°, 135 lb chys, c-l, wks ...	5.00	...	5.00	...	5.00
38°, c-l, chys, wks ...	5.50	...	5.50	...	5.50
40°, chys, c-l, wks ...	6.00	...	6.00	...	6.00
42°, c-l, chys, wks ...	6.50	...	6.50	...	6.50
CP, chys, delv ...	.11 1/2	.12 1/2	.11 1/2	.12 1/2	.11 1/2
Oxalic, 300 lb bbls, wks, or N. Y. ...	.11 1/2	.12 1/2	.11 1/2	.12 1/2	.11 1/2
Phosphoric, 50%, USP, chys ...	.14	.14	.14	.14	.14
50%, acid, c-l, drs, wks ...	.06	.08	.06	.08	.06
75%, acid, c-l, drs, wks ...	.09	.10 1/2	.09	.10 1/2	.09
Picramic, 300 lb bbls, wks lb. ...	.65	.70	.65	.70	.65
Picric, kgs, wks ...	.30	.40	.30	.40	.30
Propionic, 98% wks, drs ...	.35	...	.35	...	.35
80% ...	.15	.17 1/2	.15	.17 1/2	.15
Pyrogallie, crys, kgs, wks lb. ...	1.55	1.65	1.55	1.65	1.55
Salicylic, tech, 125 lb bbls, wks ...	.40	...	.40	...	.40
Sebaic, tech, drs, wks ...	.58	...	.58	...	.58
Succinic, bbls ...	.75	...	.75	...	.75
Sulfanilic, 250 lb bbls, wks lb. ...	.18	.19	.18	.19	.18
Sulfuric, 60°, tks, wks ...	11.00	...	11.00	...	11.00
c-l, chys, wks ...	1.10	...	1.10	...	1.10
66°, tks, wks ...	15.50	...	15.50	...	15.50
c-l, chys, wks ...	1.35	...	1.35	...	1.35
CP, chys, wks ...	.06 1/4	.07 1/4	.06 1/4	.07 1/4	.06 1/4
Fuming (Oleum) 20% tks, wks ...	18.50	...	18.50	...	18.50
Tannic, tech, 300 lb bbls ...	.23	.40	.23	.40	.23
Tartaric, USP, gran powd, 300 lb bbls ...	.24	...	.24	.24	.25
Tobias, 250 lb bbls ...	.70	.72 1/2	.70	.72 1/2	.70
Trichloroacetic bottles ...	2.45	2.75	2.45	2.75	2.45
kgs ...	1.75	...	1.75	...	1.75
Tungstic, tech, bbls ...	1.50	1.60	1.50	1.60	1.50
Vanadic, drs, wks ...	1.10	1.20	1.10	1.20	1.10
Albumen, light flake, 225 lb bbls ...	.50	.60	.50	.60	.45
dark, bbls ...	.12	.17	.12	.17	.12
egg, edible ...	.77	.79	.77	1.05	.85
vegetable, edible ...	.65	.70	.65	.70	.65

	Current Market	1936 Low	1936 High	1935 Low	1935 High
Alcohol, Amyl (from Pentane) tks, delv ...	.143	...	.143	...	...
c-l, drs, delv ...	.150	...	.150	...	...
lcl, drs, delv ...	.157	...	.157	...	...
Amyl, secondary, tks, delv ...	.108	...	.108	...	.108
Benzyl, bottles ...	.65	1.10	.65	1.10	.65
Butyl, normal, tks, f.o.b. wks, frt allowed ...	.08 1/2	.08 1/2	.11	.11	.12
c-l, drs, f.o.b. wks, frt allowed ...	.09 1/2	.09 1/2	.12	.12	.13
Butyl, secondary, tks, delv ...	.07 1/2	.07 1/2	.096	...	.096
c-l, drs, delv ...	.08 1/2	.08 1/2	.106	...	.106
Capryl, drs, tech, wks ...	.85	...	.85	...	.85
Cinnamic, bottles ...	3.25	3.65	3.25	3.65	3.25
Denatured, CD, No. 11, 12, 13, tks, c-l, drs, wks gal. e	.34	.34	.44*	.34	.49*
Western schedule, c-l, wks ...	.39	.39	.52*	.38	.52*
Denatured, SD, No. 1, tks, c-l, tks ...	.26	.23	.28	.29 1/2	.31
c-l, drs, wks, gal. e	.29	.29	.34	.34 1/2	.36
Diacetone, tech, tks, delv lb. f	.16	...	.16	...	.16
c-l, drs, delv ...	.17	...	.17	...	.17

e Yellow grades 25c per 100 lbs. less in each case; d Spot prices are 1c higher; e Anhydrous is 5c higher in each case; f Pure prices are 1c higher in each case; * Dealers were given 20% off this price.

ABBREVIATIONS—Anhydrous, anhyd; bags, bgs; barrels, bbls; carboys, cbys; carlots, c-l; less-than-carlots, lcl; drums, drs; kegs, kgs; powdered, powd; refined, retd; tanks, tks; works, f.o.b., wks.

Alcohol, Ethyl
Amyl Mercaptan

Prices—Current

Amylene
Bordeaux Mixture

	Current Market	1936		1935	
		Low	High	Low	High
Alcohols (continued)					
Ethyl, 190 proof, molasses, tks gal. g	4.07	4.07	4.10	4.08½	4.10
c-l, drs gal. g	4.13	4.12	4.27	4.13½	4.27
c-l, bbls gal. g	4.14	4.13	4.28	4.15½	4.28
absolute, drs gal. g	4.54	6.08½	4.54	6.11½	6.11½
Furfuryl, tech, 500 lb drs lb.	.35	...	.35	...	.35
Hexyl, secondary tks, delv lb.	.11½	...	.11½	...	.11½
c-l, drs, delv lb.	.12½	...	.12½	...	.12½
Normal, drs, wks lb.	3.25	3.50	3.25	3.50	3.50
Isoamyl, prim, cans, wks lb.	.32	...	.32	...	...
dr, lcl, delvd lb.	.27	...	.27	...	...
Isobutyl, refd, lcl, drs lb.	.10	.10	.12	.12	.60
c-l, drs lb.	.09½	.09½	.11½	...	...
tks lb.	.08½	.08½	.10½	...	...
Isopropyl, refd, c-l, drs, f.o.b. wks, frt allowed lb.	.55	...	.55	...	.55
Prepyl, norm, 50 gal drs gal.	.75	...	.75	...	.75
Special Solvent, tks, wks gal.	.24	.24	.32	...	...
Aldehyde ammonia, 100 gal drs lb.	.80	.82	.80	.82	.82
Alphanaphthol, crude, 300 lb bbls lb.	.60	.65	.60	.65	.65
Alphanaphthylamine, 350 lb bbls lb.	.32	.34	.32	.34	.34
Alum, ammonia, lump, c-l, bbls, wks 100 lb.	3.00	...	3.00	...	3.00
25 bbls or more, wks 100 lb.	3.15	...	3.15	...	3.15
less than 25 bbls, wks 100 lb.	3.25	...	3.25	...	3.25
Granular, c-l, bbls, wks 100 lb.	2.75	...	2.75	...	2.75
25 bbls or more, wks 100 lb.	2.90	...	2.90	...	2.90
Powd, c-l, bbls, wks 100 lb.	3.15	...	3.15	...	3.15
25 bbls or more, wks 100 lb.	3.30	...	3.30	...	3.30
Chrome, bbls 100 lb.	7.00	7.25	7.00	7.25	7.25
Potash, lump, c-l, bbls, wks 100 lb.	3.25	...	3.25	...	3.25
25 bbls or more, wks 100 lb.	3.40	...	3.40	...	3.40
Granular, c-l, bbls, wks 100 lb.	3.40	...	3.40	...	3.00
25 bbls or more, bbls, wks 100 lb.	3.00	...	3.00	...	3.15
Powd, c-l, bbls, wks 100 lb.	3.40	...	3.40	...	3.40
25 bbls or more, wks 100 lb.	3.55	...	3.55	...	3.55
Soda, bbls, wks 100 lb.	4.00	4.15	4.00	4.15	4.00
Aluminum metal, c-l, NY 100 lb.	19.00	20.00	19.00	20.00	19.00
Acetate, CP, 20%, bbls lb.	.09	.10	.09	.10	.09
Chloride anhyd, 99%, wks lb.	.07	.12	.07	.12	.07
93%, wks lb.	.05	.08	.05	.08	.05
Crystals, c-l, drs, wks lb.	.06½	.07	.06½	.07	.06½
Solution, drs, wks lb.	.03	.03½	.03	.03½	.03
Hydrate, 96%, light, 90 lb bbls, delv lb.	.13	.15	.13	.15	.13
heavy, bbls, wks lb.	.04	.04½	.04	.04½	.04
Oleate, drs lb.	.15½	...	.15½	...	.15½
Palmitate, bbls lb.	.21	.22	.21	.22	.20
Resinate, pp, bbls lb.	.15	...	.15	...	.15
Stearate, 100 lb bbls lb.	.18	.20	.18	.20	.17
Sulfate, com, c-l, bgs, wks 100 lb.	1.35	...	1.35	...	1.35
c-l, bbls, wks 100 lb.	1.55	...	1.55	...	1.55
Sulfate, iron-free, c-l, bgs, wks 100 lb.	1.90	...	1.90	...	1.90
c-l, bbls, wks 100 lb.	2.05	...	2.05	...	2.05
Aminoazobenzene, 110 lb kgs lb.	1.15	...	1.15	...	1.15
Ammonia anhyd, com, tks lb.	.04½	.05½	.04½	.05½	.04½
Ammonia anhyd, 100 lb cyl lb.	.15½	.21½	.15½	.21½	.15½
26°, 800 lb drs, delv lb.	.02½	.03	.02½	.03	.02½
Aqua 26°, tks, NH cont. tk wagon lb.	.05 .024	...	.05 .024	...	.05 .024
Ammonium Acetate, kgs lb.	.26	.33	.26	.33	.26
Bicarbonate, bbls, f.o.b. plant 100 lb.	5.15	5.71	5.15	5.71	5.15
Bifluoride, 300 lb bbls lb.	.16	.17	.15	.17	.15
carbonate, tech, 500 lb bbls lb.	.08	.12	.08	.12	.08
Chloride, White, 100 lb bbls, wks 100 lb.	4.45	4.90	4.45	4.90	4.45
Gray, 250 lb bbls, wks lb.	5.00	5.75	5.00	5.75	5.00
Lump, 500 lbs cks spot lb.	.10½	.11	.10½	.11	.10½
Lactate, 500 lb bbls lb.	.15	.16	.15	.16	.15
Linoleate lb.	.11	.12	.11	.12	.11
Nitrate, tech, cks lb.	.04	.05	.04	.05	.04
Oleate, drs lb.	...	.10	...	.10	...
Oxalate, neut, cryst, powd, bbls lb.	.26	.27	.26	.27	.26
pure, cryst, bbls, kgs lb.	.27	.28	.27	.28	.27
Perchlorate, kgs lb.	...	.16	...	.16	...
Persulfate, 112 lb kgs lb.	.22½	.25	.22½	.25	.22½
Phosphate, dibasic tech, powd, 325 lb bbls lb.	.07½	.10	.07½	.10	.08
Sulfate, dom, f.o.b., bulk ton 200 lb bgs ton	nom.	22.00	nom.	25.50	25.80
100 lb bgs ton	nom.	...	nom.	26.00	26.50
Sulfocyanide, kgs lb.	.55	...	.55	...	.50
Amyl Acetate (from pentane) tks, delv lb.	...	.13½	...	.13½	...
tech, drs, delv lb.	.142	.149	.142	.149	.142
secondary, tks, delv lb.	...	.108	...	.108	...
c-l, drs, delv lb.	.118	.123	.118	.123	.118
Amyl Chloride, norm drs, wks lb.	.56	.68	.56	.68	.56
Chloride, mixed, drs, wks lb.	.07	.077	.07	.077	.07
tks, wks lb.	...	.06	...	.06	...
Mercaptan, drs, wks lb.	1.10	...	1.10	...	1.10
Oleate, lcl, wks, drs lb.	.25	...	...	...	...
Stearate, lcl, wks, drs lb.	.26	...	...	...	...

g Grain alcohol 20c a gal. higher in each case.

	Current Market	1936		1935	
		Low	High	Low	High
Amylene, drs, wks lb.	.102	.11	.102	.11	.102
tks, wks lb.	...	.09	...	.09	...
Aniline Oil, 960 lb drs and tks lb.	.15	.17½	.15	.17½	.15
Annatto fine lb.	.34	.37	.34	.37	.34
Anthracene, 80% lb.	...	.75	...	.75	...
40% lb.	...	.18	...	.18	...
Anthraquinone, sublimed, 125 lb bbls lb.	.50	.52	.50	.52	.50
Antimony metal slabs, ton lots lb.	...	.12½	.11½	.13½	.12½
Needle, powd, bbls lb.	.11½	.12	.11	.12½	.09
Butter of, see Chloride.	...	...	...	...	...
Chloride, soln clys lb.	.13	.17	.13	.17	.13
Oxide, 500 lb bbls lb.	.12½	.13	.12½	.14	.10½
Salt, 63% to 65%, tins lb.	.22	.24	.22	.24	.22
Sulfuret, golden, bbls lb.	.22	.23	.22	.23	.19
Vermilion, bbls lb.	.35	.42	.35	.42	.35
Archil, conc, 600 lb bbls lb.	.21	.27	.21	.27	.21
Double, 600 lb bbls lb.	.18	.20	.18	.20	.18
Triple, 600 lb bbls lb.	.18	.20	.18	.20	.18
Argols, 80%, casks lb.	.14	.15	.14	.15	.15
Crude, 30%, casks lb.	.07	.08	.07	.08	.07
Aracolors, wks lb.	.18	.30	.18	.30	.18
Arrowroot, bbl lb.	.08½	.09½	.08½	.09½	.08½
Arsenic, Red, 224 lb cs kgs lb.	...	.15½	...	.15½	...
White, 112 lb kgs lb.	.03½	.04½	.03½	.04½	.03½
Metal lb.	.40	.42	.40	.42	.40
Asbestine, c-l, wks ton	13.00	15.00	13.00	15.00	13.00
Barium Carbonate precip, 200 lb bgs, wks ton	56.50	61.00	56.50	61.00	56.50
Nat (withierite) 90% gr, c-l, wks, bgs ton	42.00	45.00	42.00	45.00	42.00
Chlorate, 112 lb kgs NY lb.	.15½	.17½	.15½	.17	.14
Chloride, 600 lb bbl, wks ton	72.00	74.00	72.00	74.00	72.00
Dioxide, 88%, 690 lb drs lb.	.11	.12	.11	.12	.11
Hydrate, 500 lb bbls lb.	.05½	.06	.05½	.06	.05½
Nitrate, 700 lb cks lb.	...	.08½	...	.08½	...
Barytes, floated, 350 lb bbls wks ton	23.65	31.15	23.65	31.15	23.00
Bauxite, bulk, mines ton	7.00	10.00	7.00	10.00	7.00
Bentonite, c-l, No. 1, bgs, wks ton	...	16.50	...	16.50	16.50
No. 2 ton	...	11.00	...	11.00	11.00
Benzaldehyde, tech, 945 lb drs, wks lb.	.60	.62	.60	.62	.60
Benzene (Benzol), 90%, Ind, 8000 gal tks, frt allowed gal.	...	.16	.16	.18	.15
90% c-l, drs gal.	...	.23	...	.23	.23
Ind Pure, tks, frt allowed gal.	...	.16	.16	.18	.15
Benzidine Base, dry, 250 lb bbls lb.	.72	.74	.72	.74	.67
Benzoyl Chloride, 500 lb drs lb.	.40	.45	.40	.45	.40
Benzyl Chloride, tech, drs lb.	.30	.40	.30	.40	.30
Beta-Naphthol, 250 lb bbl, wks lb.	.24	.27	.24	.27	...
Naphthylamine, sublimed, 200 lb bbls lb.	1.25	1.35	1.25	1.35	1.25
Tech, 200 lb bbls lb.	.53	.55	.53	.55	.53
Bismuth metal lb.	1.00	1.10	1.00	1.10	.90
Chloride, boxes lb.	3.20	3.25	3.20	3.25	3.20
Hydroxide, boxes lb.	3.15	3.20	3.15	3.20	3.15
Oxychloride, boxes lb.	2.95	3.00	2.95	3.00	2.95
Subbenzoate, boxes lb.	3.25	3.30	3.25	3.30	3.25
Subcarbonate, kgs lb.	1.40	1.45	1.40	1.45	1.35
Trioxide, powd, boxes lb.	3.45	3.50	3.45	3.50	3.45
Subnitrate lb.	1.30	1.35	1.30	1.35	1.30
Blackstrap, cane (see Molasses, Blackstrap).	...	...	...	...	...
Blanc Fixe, 400 lb bbls, wks ton	42.50	70.00	42.50	70.00	42.50
Bleaching Powder, 800 lb drs, c-l, wks, contract 100 lb.	...	2.00	...	2.00	1.90
lcl, drs, wks lb.	2.25	3.60	2.25	3.60	2.15
Blood, dried, f.o.b., NY unit	...	4.20	2.50	4.25	2.50
Chicago, high grade unit	...	4.25	2.90	4.50	2.50
Imported shipt unit	3.45	3.50	2.60	3.60	2.75
Blues, Bronze Chinese Milori Prussian Soluble lb.	.37	.38½	.37	.38½	.36½
Ultramarine, dry, wks, bbls lb.	...	.10	...	.10	...
Regular grade, group 1 lb.	...	.15	...	.15	...
Special, group 1 lb.	...	.18	...	.18	...
Pulp, No. 1 lb.	...	.26	...	.26	...
Bone, 4½ + 50% raw, Chicago ton	23.00	25.00	20.00	25.00	19.00
Bone Ash, 100 lb kgs lb.	.06	.07	.06	.07	.06
Black, 200 lb bbls lb.	.05½	.08½	.05½	.08½	.05½
Meal, 3% & 50%, imp. ton	...	24.15	23.00	24.75	22.75
Domestic, bgs, Chicago ton	...	18.00	16.00	20.00	16.00
Borax, tech, gran, 80 ton lots, sacks, delv ton	...	40.00	...	40.00	36.00
bbls, delv ton	...	50.00	...	50.00	46.00
c-l, sacks, delv ton	...	44.00	...	44.00	40.00
c-l, bbls, delv ton	...	54.00	...	54.00	50.00
Tech, powd, 80 ton lots, sacks ton	...	45.00	...	45.00	41.00
bbls, delv ton	...	56.00	...	56.00	51.00
c-l, sacks, delv ton	...	49.00	...	49.00	45.00
c-l, bbls, delv ton	...	59.00	...	59.00	55.00
Bordeaux Mixture, jobbers, East, c-l, tins, drs, cases lb.	.08	.16	.08	.16	.08
Jobbers, West, c-l lb.	.08	.10	.08	.10	.08
Dealers, East, c-l lb.	.08½	.16½	.08½	.16½	.08½
Dealers, West, c-l lb.	.09	.11	.09	.11	.09

h Lowest price is for pulp, highest for high grade precipitated; i Crystals \$6 per ton higher; USP, \$15 higher in each case; * Freight is equalized in each case with nearest producing point.

**J & L
BENZOL**

consultation service

If you have benzol problems as yet unsolved, an interview with the J & L Benzol Consultant will be helpful.

Jones & Laughlin service includes the study of your benzol requirements—if your present specifications are not satisfactory—as well as providing a continuous supply of uniform quality when the correct specifications are known. This company has been serving industry since 1850. Its broad experience, its notable achievements in many fields and its reputation for sound practice characterize J & L as a dependable source of supply. May we prepare a test sample of benzol made to your specifications?

Look to Jones & Laughlin, also, for structural steel, pipe, boiler tubes and all of the other steel products that you use.

J & L LIGHT OIL DISTILLATES

Pure Benzol *Motor Benzol*
Pure Toluol *Solvent Naphtha*
90% Benzol *Xylols*

**J & L
STEEL**

JONES & LAUGHLIN STEEL CORPORATION
AMERICAN IRON AND STEEL WORKS
PITTSBURGH, PENNSYLVANIA

Bromine

Chromium Fluoride

Prices

	Current Market	Low	High	Low	High
Bromine, caseslb.	.30	.43	.30	.43	.30
Bronze, Al, pwd, 300 lb drs lb.	.80	1.50	.80	1.50	.80
Gold, blklb.	.40	.55	.40	.55	.40
Butanes, com 16-32° group 3 tkslb.	.04	.04	.04	.04	.04
Butyl, Acetate, norm drs, frt allowedlb.	.09 1/2	.10	.09 1/2	.12 1/2	.12
tk, frt allowedlb.	.08 1/2	.08 1/2	.11	.11	.13
Secondary, tks, frt allowedlb.	.07 1/2	.07 1/2	.096	.096	.096
drs, frt, allowedlb.	.08 1/2	.09	.106	.111	.106
Aldehyde, 50 gal drs, wkslb.	.19	.21	.19	.21	.19
Carbinol, norm drs, wks lb.	.60	.75	.60	.75	.60
Lactate, drslb.	.22 1/2	.23 1/2	.22 1/2	.23 1/2	.22 1/2
Propionate, drslb.	.18	.18 1/2	.18	.18 1/2	.18
tk, delvlb.	.17	.17	.17	.17	.17
Stearate, 50 gal drslb.	.26	.26	.26	.26	.26
Tartrate, drslb.	.55	.60	.55	.60	.55
Butyraldehyde, drs, lcl, wks lb.	.35 1/2	.35 1/2	.35 1/2	.35 1/2	.35 1/2
Cadmium, Sulfide, boxeslb.	.90	1.00	.90	1.10	.75
Cadmium Metallb.	.75	1.05	.75	1.05	.55
Calcium, Acetate, 150 lb bgs c-l, delv100 lb.	2.10	2.10	2.10	2.00	2.10
Arsenate, jobbers, East of Rocky Mts, drslb.	.06	.06 3/4	.06	.06 3/4	.06
dealers, drslb.	.06 1/4	.07 3/4	.06 1/4	.07 3/4	.06 1/4
South, jobbers, drslb.	.06	.06 1/2	.06	.06 1/2	.06
dealers, drslb.	.06 1/2	.06 3/4	.06 1/2	.06 3/4	.06 1/4
Carbide, drslb.	.05	.06	.05	.06	.05
Carbonate, tech, 100 lb bgs c-llb.	1.00	1.00	1.00	1.00	1.00
Chloride, flake, 375 lb drs, c-l, wkston	19.50	19.50	19.50	19.50	19.50
Solid, 650 lb drs, c-l, f.o.b. wkston	17.50	17.50	17.50	17.50	17.50
Ferrocyanide, 350 lb bbls wkslb.	.17	.17	.17	.17	.17
Gluconate, Pharm, 125 lb bblslb.	.50	.57	.50	.57	.50
Nitrate, 100 lb bgston	26.50	26.50	26.50	26.50	26.50
Palmitate, bblslb.	.21	.22	.21	.22	.20
Peroxide, 100 lb drslb.	1.25	1.25	1.25	1.25	1.25
Phosphate, tech, 450 lb bblslb.	.07 1/2	.08	.07 1/2	.08	.07 1/2
Resinate, precip, bblslb.	.13	.14	.13	.14	.13
Stearate, 100 lb bblslb.	.18	.20	.18	.20	.17
Camphor, slabslb.	.50	.50	.50	.50	.49
Powderlb.	.4940	.56	.4940	.56	.50
Camwood, Bk, ground bbls lb.	.16	.18	.16	.18	.16
Carbon, Decolorizing, drs c-llb.	.08	.15	.08	.15	.08
Black, c-l, bgs, delv, price varying with zonelb.	.0445	.0535	.0445	.0535	.0445
lcl, bgs, delv, all zones lb.	.07	.07	.07	.07	.07
cartons, delvlb.	.07 3/4	.07 3/4	.07 3/4	.07 3/4	.07 3/4
cases, delvlb.	.08 1/4	.08 1/4	.08 1/4	.08 1/4	.08 1/4
Bisulfide, 500 lb drslb.	.05 1/4	.08	.05 1/4	.08	.05 1/4
Dioxide, Liq 20-25 lb cyl lb.	.06	.08	.06	.08	.06
Tetrachloride, 1400 lb drs, delvlb.	.05 1/4	.06	.05 1/4	.06	.05 1/4
Casein, Standard, Dom, grd lb.	.17 1/2	.18 3/4	.14 1/2	.18 3/4	.09 1/2
80-100 mesh, c-l, bgslb.	.18	.19 3/4	.15	.19 3/4	.10
Castor Pomace, 5 1/2 NHs, c-l, bgs, wkston	18.50	15.00	18.50	16.00	18.50
Imported, ship, bgston	17.00	17.00	18.00	17.25	20.00
Celluloid, Scraps, ivory cs lb.	.17	.18	.17	.18	.17
Transparent, cslb.	.20	.20	.20	.20	.20
Cellulose, Acetate, 50 lb kgslb.	.55	.60	.55	.60	.55
Chalk, dropped, 175 lb bbls lb.	.03	.03 3/4	.03	.03 3/4	.03
Precip, heavy, 560 lb cks lb.	.03	.04	.03	.04	.03
Light, 250 lb ckslb.	.03	.04	.03	.04	.03
Charcoal, Hardwood, lump, blk, wksbu.	.15	.15	.15	.15	.15
Willow, powd, 100 lb bbl, wkslb.	.06	.06 1/4	.06	.06 1/4	.06
bgs, delv*ton	24.40	25.40	24.40	25.40	30.00
Chestnut, clarified bbls, wks lb.	.01 1/4	.01 1/4	.01 1/4	.01 1/4	.01 1/4
25% tks, wkslb.	.01 1/2	.01 1/2	.01 1/2	.01 1/2	.01 1/2
Pwd, 60%, 100 lb bgs, wkslb.	.04 1/4	.04 1/4	.04 1/4	.04 1/4	.04 1/4
China Clay, c-l, blk mines ton	7.00	7.00	7.00	7.00	7.00
Powdered, bblslb.	.01	.02	.01	.02	.01
Pulverized, bbls, wkston	10.00	12.00	10.00	12.00	10.00
Imported, lump, blkton	15.00	25.00	15.00	25.00	15.00
Chlorine, cyls, lcl, wks, contractlb.	.07 1/2	.08 1/2	.07 1/2	.08 1/2	.07 1/2
cyls, c-l, contractlb.	.05 1/2	.05 1/2	.05 1/2	.05 1/2	.05 1/2
Liq, tk, wks, contract 100 lb.	2.15	2.15	2.15	2.00	2.15
Multi, c-l, cyls, wks, contractlb.	2.30	2.55	2.30	2.55	2.30
Chloroacetophenone, tins, wkslb.	2.00	2.00	2.00	2.00	2.00
Chlorobenzene, Mono, 100 lb drs, lcl, wkslb.	.06	.07 1/4	.06	.07 1/4	.06
Chloroform, tech, 1000 lb drslb.	.20	.21	.20	.21	.20
USP, 25 lb tinslb.	.30	.31	.30	.31	.30
Chloropierin; comml cylslb.	.85	.90	.85	.90	.85
Chrome, Green, CPlb.	.18 1/2	.21 1/2	.21 1/2	.21 1/2	.17
Yellowlb.	.12	.13	.11	.13	.11
Chromium, Acetate, 8% Chrome, bblslb.	.06	.08	.06	.08	.05
20° soln, 400 lb bblslb.	.05 1/4	.05 1/4	.05 1/4	.05 1/4	.05 1/4
Fluoride, powd, 400 lb bbllb.	.27	.28	.27	.28	.27

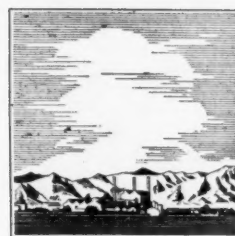
j A delivered price; * Depends upon point of delivery.

Current

Coal Tar Diphenylguanidine

	Current Market	1936		1935	
		Low	High	Low	High
Coal tar, bbls.....bbl.	7.25	9.00	7.25	9.00	7.25
Cobalt Acetate, bbls.....lb.	..	.58	..	.60	..
Carbonate tech, bbls.....lb.	1.42 3/4	1.48	1.35	1.48	1.35
Hydrate, bbls.....lb.	1.66	1.76	1.66	1.76	1.66
Linoleate, paste, bbls.....lb.	..	.31 1/4	.30	.31 1/4	..
Resinate, fused, bbls.....lb.	..	.13	.12 1/2	.13	..
Precipitated, bbls.....lb.	..	.32	..	.32	..
Oxide, black, bgs.....lb.	1.41	1.51	1.29	1.49	1.25
Cochineal, gray or bk bgs.....lb.	.32	.36	.32	.36	.32
Teneriffe silver, bgs.....lb.	.33	.37	.33	.37	.33
Copper, metal, electrol 100 lb.	..	9.75	9.50	9.75	8.00
Carbonate, 400 lb bbls.....lb.	..	.08 1/4	..	.08 1/4	..
52-54% bbls.....lb.	.14 1/2	.16 1/4	.14 1/2	.16 1/4	.14 1/2
Chloride, 250 lb bbls.....lb.	.17	.18	.17	.18	.17
Cyanide, 100 lb drs.....lb.	.37	.38	.37	.38	.37
Oleate, precip, bbls.....lb.	..	.20	..	.20	..
Oxide, red, 100 lb bbls.....lb.	.14	.15	.14	.15	.14
black bbls, wks.....lb.	.14 1/2	.15	.14 1/2	.15	.14
Resinate, precip, bbls.....lb.	.18	.19	.18	.19	.18
Stearate, precip, bbls.....lb.	.35	.40	.35	.40	.35
Sub-acetate verdigris, 400 lb bbls.....lb.	.18	.19	.18	.19	.18
Sulfate, bbls, c-1, wks 100 lb.	..	4.00	3.85	4.00	..
Copperas, crys and sugar bulk c-1, wks, bgs.....ton	14.00	16.00	13.00	16.00	12.00
Corn Syrup, 42 deg, bbls 100 lb.	..	3.95	3.05	3.95	3.18
43 deg, bbls.....100 lb.	..	4.05	3.10	4.05	3.23
Corn Sugar, tanners, bbls 100 lb.	..	4.03	3.08	4.03	3.46
Cotton, Soluble, wet, 100 lb bbls.....lb.	.40	.42	.40	.42	.40
Cream Tartar, USP, powd & gran, 300 lb bbls.....lb.	..	.16 1/4	.16 1/4	.16 1/4	.17 1/4
Cresote, USP, 42 lb cbys lb.	.45	.47	.45	.47	.45
Oil, Grade 1, tks.....gal.	.12 1/4	.13 1/4	.12 1/4	.13 1/4	.11 1/4
Grade 2.....gal.	.109	.12	.109	.12	.10 1/2
Cresol, USP, drs.....lb.	.10	.10 1/4	.10	.10 1/4	.10
Crotonaldehyde, 98%, drs, wks.....lb.	.26	.30	.26	.30	.32
Cudbear, English.....lb.	.19	.25	.19	.25	.19
Cutch, Philippine, 100 lb bale lb.	.04	.04 1/4	.04	.04 1/4	.03 1/2
Cyanamid, bgs, c-1, frt allowed Ammonia unit.....	..	1.07 1/4	..	1.07 1/4	..
Dextrin, corn, 140 lb bgs f.o.b., Chicago.....100 lb.	4.85	4.90	3.45	5.00	3.60
British Gum, bgs.....100 lb.	5.20	5.25	3.70	5.40	3.85
White, 140 lb bgs.....100 lb.	4.80	4.90	3.40	4.95	3.50
Potato, Yellow, 220 lb bgs lb.	.07 3/4	.08 3/4	.07 3/4	.08 3/4	.07 3/4
White, 220 lb bgs, lcl.....lb.	.08	.09	.08	.09	.08
Tapioca, 200 bgs, lcl.....lb.	..	.08	..	.08	.08 1/4
Diamylamine, drs, wks.....lb.	..	.75	.75	1.00	..
Diamylene, drs, wks.....lb.	.095	.102	.095	.102	.095
tk, wks.....lb.	..	.08 1/4	..	.08 1/4	..
Diamylether, wks, drs.....lb.	.085	.092	.085	.092	.085
tk, wks.....lb.	..	.075	..	.075	..
Oxalate, lcl, drs, wks.....lb.	..	.30	..	..	..
Diamylphthalate, drs wks gal.	.18	.19 1/4	.18	.19 1/4	.18
Diamyl Sulfide, drs, wks.....lb.	..	1.10	..	1.10	..
Dianisidine, bbls.....lb.	2.25	2.45	2.25	2.45	2.25
Dibutyl Ether, drs, wks, lcl lb.	..	.22	..	..	..
Dibutylphthalate, drs, wks, frt allowed.....lb.	..	.18	.18	.21	.20
Dibutyltartrate, 50 gal drs lb.	.35	.40	.35	.40	.35
Dichloroethylene, drs.....gal.	.29	..	.29	..	.29
Dichloroethylether, 50 gal drs, wks.....lb.	.16	.17	.16	.17	.16
tk, wks.....lb.	..	.15	..	.15	..
Dichloromethane, drs, wks lb.	..	.23	..	.23	.15
Dichloropentanes, drs, wks lb.	.032	.040	.032	.040	.032
tk, wks.....lb.	..	.02 1/4	..	.02 1/4	..
Diethanolamine, tks, wks.....lb.	..	.30	..	.30	..
Diethylamine, 400 lb drs.....lb.	2.75	3.00	2.75	3.00	2.75
Diethyl Carbinol, drs.....lb.	.60	.75	.60	.75	.60
Diethylcarbonate, com drs lb.	.31 1/4	.35	.31 1/4	.35	.31 1/4
90% grade, drs.....lb.	..	.25	..	.25	..
Diethylaniline, 850 lb drs.....lb.	.52	.55	.52	.55	.52
Diethylorthotoluidin, drs.....lb.	.64	.67	.64	.67	.64
Diethyl phthalate, 1000 lb drs.....lb.	.18 1/4	.19	.18 1/4	.19	.18 1/4
Diethylsulfate, tech, drs, wks, lcl.....lb.	..	.20	..	.20	..
Diethyleneglycol, drs.....lb.	.16 1/4	.17 1/4	.15 1/4	.17 1/4	.15 1/4
Mono ethyl ethers, drs.....lb.	.16	.17	.15	.17	.15
tk, wks.....lb.	..	.15	..	.15	..
Mono butyl ether, drs.....lb.	..	.26	..	.26	..
Diethylene oxide, 50 gal drs, wks.....lb.	.20	.24	.20	.24	.20
Diglycol Oleate, bbls.....lb.	..	.24	..	.24	.16
Dimethylamine, 400 lb drs, pure 25 & 40% sol 100% basis.....lb.	..	.95	..	.95	..
Dimethylaniline, 340 lb drs lb.	.29	.30	.29	.30	.29
Dimethyl Ethyl Carbinol, drs lb.	.60	.75	.60	.75	.60
Dimethyl phthalate, drs, wks, frt allowed.....lb.	.19 1/4	.20	.19 1/4	.21 1/4	.20 1/4
Dimethylsulfate, 100 lb drs lb.	.45	.50	.45	.50	.45
Dinitrobenzene, 400 lb bbls.....lb.	.17	.19 1/4	.17	.19 1/4	.17
Dinitrochlorobenzene, 400 lb bbls.....lb.	.14	.15 1/4	.14	.15 1/4	.14
Dinitronaphthalene, 350 lb bbls.....lb.	.34	.37	.34	.37	.34
Dinitrophenol, 350 lb bbls lb.	.23	.24	.23	.24	.23
Dinitrotoluene, 300 lb bbls lb.	.15 1/2	.16 1/4	.15 1/4	.16 1/4	.15 1/4
Diphenyl.....lb.	.15	.25	.15	.25	.15
Diphenylamine.....lb.	.31	.32	.31	.32	.31
Diphenylguanidine, 100 lb bbl.....lb.	.35	.37	.35	.37	.36

* Higher price is for purified material.



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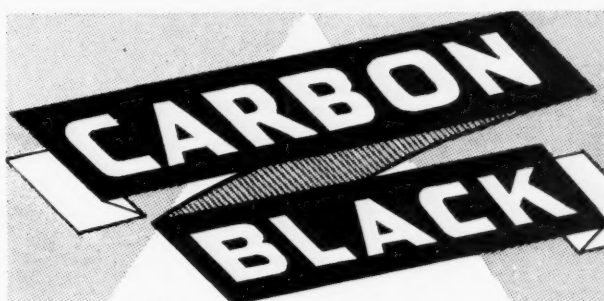
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Dip Oil Glycerin

Prices

	Current Market	1936 Low	1936 High	1935 Low	1935 High
Dip Oil, see Tar Acid Oil.					
Divi Divi pods, bgs shipmt	32.00	35.00	32.00	45.00	36.00 40.00
Extract .....lb.	.05	.05 1/2	.05	.05 1/2	.05 .05 1/2
Egg Yolk, dom., 200 lb cases					
.....lb.	.68	.63	.68	.46	.63
Imported .....lb.	.50	.55	.48	.56	...
Epsom Salt, tech, 300 lb bbls					
c-l NY .....100 lb.	1.80	2.00	1.80	2.00	1.80 2.25
USP, c-l, bbls .....100 lb.	2.00	...	2.00	2.00	2.25
Ether, USP anaesthesia 55 lb					
drs .....lb.	.22	.23	.22	.23	.22 .23
(Conc) .....lb.	.09	.10	.09	.10	.09 .10
Ether, Isopropyl 50 gal drs lb.	.07	.08	.07	.08	.07 .08
tk, frt allowed .....lb.	...	.06	...	.06	...
Nitrous, conc, bottles .....lb.	.75	.77	.75	.77	.75 .77
Synthetic, wks, drs .....lb.	.08	.09	.08	.09	.08 .09
Ethyl Acetate, 85% Ester					
tk, frt alld .....lb.	...	.06 1/2	.06 1/2	.08	.07 1/2 .08
drs, frt alld .....lb.	...	.07 1/2	.07 1/2	.09	.08 1/2 .09
Anhydrous, tk, frt alld .....lb.	...	.07 1/2	.07	.08 1/2	...
tk, frt alld .....lb.	...	.08 1/2	.08	.10	.09 1/2 .10
Acetoacetate, 110 gal drs lb.	...	.37	.37	.68	.65 .68
Benzylaniline, 300 lb drs lb.	.88	.90	.88	.90	.88 .90
Bromide, tech, drs .....lb.	.50	.55	.50	.55	.50 .55
Chloride, 200 lb drs .....lb.	.22	.24	.22	.24	.22 .24
Chlorocarbonate chys .....lb.	...	.30	...	.30	...
Crotonate, drs .....lb.	1.00	1.25	1.00	1.25	1.00 1.25
Ether, Absolute, 50 gal drs					
.....lb.	.50	.52	.50	.52	.50 .52
Lactate, drs, wks .....lb.	.25	.29	.25	.29	.25 .29
Methyl Ketone, 50 gal drs,					
frt allowed .....lb.	.07 1/2	.08	.07 1/2	.09	.08 1/2 .09
tk, frt allowed .....lb.	...	.06 1/2	...	.07 1/2	...
Oxalate, drs, wks .....lb.	.37 1/2	.55	.37 1/2	.55	.37 1/2 .55
Oxybutyrate, 50 gal drs,					
wks .....lb.	.30	.30 1/2	.30	.30 1/2	.30 .30 1/2
Ethylene Dibromide, 60 lb					
drs .....lb.	.65	.70	.65	.70	.65 .70
Chlorhydrin, 40%, 10 gal					
chys chloro, cont .....lb.	.75	.85	.75	.85	.75 .85
Anhydrous .....lb.	...	.75	...	.75	...
Dichloride, 50 gal drs, wks					
.....lb.	.0545	.0994	.0545	.0994	.0545 .0994
Glycol, 50 gal drs, wks lb.	.17	.21	.17	.21	.17 .28
tk, wks .....lb.	...	.16	...	.16	...
Mono Butyl Ether, drs,					
tk, wks .....lb.	.20	.21	.20	.21	.20 .21
tk, wks .....lb.	...	.19	...	.19	...
Mono Ethyl Ether, drs,					
tk, wks .....lb.	.16	.17	.16	.17	.16 .17
tk, wks .....lb.	...	.15	...	.15	...
Mono Ethyl Ether Ace-					
tate, drs, wks .....lb.	...	.14	.14	.18 1/2	.17 1/2 .18 1/2
tk, wks .....lb.	...	.13	.13	.16 1/2	...
Mono, Methyl Ether, drs					
tk, wks .....lb.	.19	.23	.19	.23	.19 .23
tk, wks .....lb.	...	.18	...	.18	...
Stearate .....lb.	.18	.18	.18	.18	.18 .18
Oxide, cyl .....lb.	.50	.55	.50	.60	.55 .75
Ethylidenaniline .....lb.	.45	.47 1/2	.45	.47 1/2	.45 .47 1/2
Feldspar, blk pottery .....ton	14.50	...	14.50	...	14.50
Powd, blk, wks .....ton	14.00	14.50	14.00	14.50	14.00 14.50
Ferric Chloride, tech, crys,					
475 lb bbls .....lb.	.05	.07 1/2	.05	.07 1/2	.05 .07 1/2
sol, 42° chys .....lb.	.06 1/2	.06 1/2	.06 1/2	.06 1/2	.06 1/2 .06 1/2
Fish Scrap, dried, unground,					
wks .....unit	...	3.25	2.50	3.25	2.25 2.90
Acid, Bulk, 6 & 3%, delv					
Norfolk & Baltimore basis					
.....unit m	...	nom.	...	2.25	2.00 2.35
Fluorapar, 98%, bgs .....lb.	30.00	35.50	30.00	35.50	28.00 35.50
Formaldehyde, USP, 400 lb					
bbls, wks .....lb.	.06	.07	.06	.07	.06 .07
Fossil Flour .....lb.	.02 1/2	.04	.02 1/2	.04	.02 1/2 .04
Fullers Earth, blk, mines					
.....ton	6.50	15.00	6.50	15.00	6.50 15.00
Imp powd, c-l, bgs .....ton	23.00	30.00	23.00	30.00	23.00 30.00
Furfural (tech) drs, wks .....lb.	.10	.15	.10	.15	.10 .15
Furfuramide (tech) 100 lb					
drs .....lb.	...	.30	...	.30	...
Fusel Oil, 10% impurities lb.	.16	.18	.16	.18	.16 .18
Fustic, chips .....lb.	.04	.05	.04	.05	.04 .05
Crystals, 100 lb boxes .....lb.	.20	.23	.20	.23	.20 .23
Liquid 50°, 600 lb bbls .....lb.	.08 1/2	.12	.08 1/2	.12	.08 1/2 .12
Solid, 50 lb boxes .....lb.	.16	.18	.16	.18	.16 .18
Sticks .....ton	25.00	26.00	25.00	26.00	25.00 26.00
G Salt paste, 360 lb bbls .....lb.	.45	.47	.45	.47	.42 .43
Gall Extract .....lb.	.18	.20	.18	.20	.18 .20
Gambier, com 200 lb bgs .....lb.	...	.06	...	.06	.05 .08
Singapore cubes, 150 lb					
bgs .....100 lb.	.08	.09	.08	.09	.07 1/2 .09 1/2
Gelatin, tech, 100 lb cs .....lb.	.50	.55	.50	.55	.50 .55
Glauber's Salt, tech, c-l, wks					
.....100 lb.	1.10	1.30	1.10	1.30	1.10 1.30
Anhydrous, see Sodium Sul-					
fate.					
Glue, bone, com grades, c-l					
bgs .....lb.	.10 1/2	.17 1/2	.10 1/2	.17 1/2	...
Better grades, c-l, bgs lb.	.12	.17 1/2	.12	.17 1/2	...
Casein, kgs .....lb.	.18	.22	.18	.22	.18 .22
Glycerin, CP, 550 lb drs .....lb.	...	.19 1/2	.16	.19 1/2	.14 .14 1/2
Dynamite, 100 lb drs .....lb.	...	.17 1/2	.13 1/2	.17 1/2	.13 1/2 .14 1/2
Saponification, drs .....lb.	...	.16	.10 1/2	.16	.10 .11 1/2
Soap Lye, drs .....lb.	...	.14	.09 1/2	.14	.09 .10

i + 10; m + 50.

Current

Glyceryl Phthalate Gum, Yacca

	Current Market	1936		1935	
		Low	High	Low	High
Glyceryl Phthalate .....lb.	.29	.28	.29	.28	.28
Glyceryl Stearate, bbls.....lb.	.18	.18	.18	.18	.18
Glycol Phthalate .....lb.	.35	.29	.35	.28	.29
Glycol Stearate .....lb.	.23	.23	.23	.18	.23
Graphite:					
Crystalline, 500 lb bbls					
.....lb.	.04	.05	.04	.05	.05
Flake, 500 lb. bbls .....lb.	.08	.16	.08	.16	.16
Amorphous, bbls .....lb.	.03	.04	.03	.04	.04

GUMS

Gum Aloes, Barbadoes ....lb.	.85	.90	.85	.90	.85	.90
Arabic, amber sorts .....lb.	.09 3/4	.10	.09	.10 3/4	.09 3/4	.15
White sorts, No. 1, bgs						
.....lb.	.27	.28	.25	.28	.21	.27
No. 2, bgs .....lb.	.25	.26	.24	.26	.19	.26
Powd, bbls .....lb.	.13	.14	.13	.14	.13 3/4	.18
Asphaltum, Barbadoes (Man-jak) 200 lb bgs, f.o.b., NY						
.....lb.	.02 1/2	.10 1/4	.02 1/2	.10 1/4	.02 1/2	.10 1/4
Egyptian, 200 lb cases, f.o.b., NY						
.....lb.	.12	.15	.12	.15	.12	.15
California, f.o.b., NY, dra						
ton	29.00	55.00	29.00	55.00	29.00	55.00
Benzoin Sumatra, USP, 120 lb cases						
.....lb.	.16	.17	.15	.19	.19	.28
Copal, Congo, 112 lb bgs, clean, opaque						
.....lb.	.19 1/2	.18 1/4	.20	.19 1/2	.24 3/4	
Dark amber .....lb.	.07 3/4	.07 3/4	.08	.07 1/4	.09 1/4	
Light amber .....lb.	.11 1/4	.11 1/4	.14 3/4	.11 1/2	.14 3/4	
Copal, East India, 180 lb bgs						
Macassar pale bold						
.....lb.	.12 3/4	.13 1/4	.12 3/4	.14	.09 3/4	.10 3/4
Chips .....lb.	.06 3/4	.06 1/4	.06 1/4	.06 3/4	.05 3/4	.06
Nubs .....lb.	.11 1/4	.10 3/4	.11 1/4	.11 1/4	.11 1/4	
Dust .....lb.	.03 3/4	.04 1/4	.03 3/4	.04 1/4	.03 3/4	.04 1/4
Singapore						
Bold						
.....lb.	.15 1/4	.15 1/4	.16 3/4	.12 3/4	.17	
Chips .....lb.	.04 3/4	.04 3/4	.05 3/4	.04 3/4	.05 3/4	
Nubs .....lb.	.10	.10	.11 1/4	.10	.11 1/4	
Dust .....lb.	.03 3/4	.04 1/4	.03 3/4	.04 1/4	.03 3/4	.05 1/4
Copal Manila, 180-190 lb baskets, Loba A						
.....lb.	.10 3/4	.10 3/4	.13	.11 3/4	.13	
Loba B .....lb.	.09 3/4	.09 3/4	.12	.10 3/4	.12	
Loba C .....lb.	.09 3/4	.09 3/4	.11 1/4	.10 3/4	.11 1/4	
MA sorts .....lb.	.06 3/4	.06 3/4	.07 3/4	.06	.07 3/4	
DBB .....lb.	.08	.08 3/4	.08	.08	.09	
Dust .....lb.	.05 1/4	.05 1/4	.06 3/4	.04 3/4	.06 3/4	
Copal Pontianak, 224 lb cases, bold genuine						
.....lb.	.14 3/4	.14 3/4	.14 3/4	.16	.14 3/4	.16 3/4
Mixed .....lb.	.13 3/4	.13 3/4	.13 3/4	.13 3/4	.12 3/4	.14 3/4
Chips .....lb.	.07 3/4	.07 3/4	.07	.07 3/4	.06 3/4	.08 3/4
Nubs .....lb.	.10 3/4	.10 3/4	.10 3/4	.10 3/4	.09 3/4	.11 3/4
Split .....lb.	.12 3/4	.13	.12 3/4	.13	.12 3/4	.13 3/4
Dammar Batavia, 136 lb cases						
A						
.....lb.	.21 3/4	.22 1/4	.21 3/4	.22 1/4	.19	.21 3/4
B						
.....lb.	.20 3/4	.21 1/4	.20 3/4	.21 1/4	.18	.20 3/4
C						
.....lb.	.16 3/4	.16 3/4	.17 3/4	.16	.17	
D						
.....lb.	.14 3/4	.14 3/4	.13 3/4	.14 3/4	.11 3/4	.14 3/4
A/D						
.....lb.	.16 3/4	.15 3/4	.17	.14	.16	
A/E						
.....lb.	.13 3/4	.13 3/4	.13 3/4	.14 3/4	.11 3/4	.13 3/4
E						
.....lb.	.06 3/4	.07 1/4	.06 3/4	.07 1/4	.07	.07 1/4
F						
.....lb.	.06 3/4	.06 3/4	.06 3/4	.06 3/4	.06 3/4	.06 3/4
Singapore						
No. 1						
.....lb.	.16 3/4	.16 3/4	.16 3/4	.17 3/4	.15 3/4	.19
No. 2						
.....lb.	.13 3/4	.14 3/4	.13 3/4	.14 3/4	.10 3/4	.14 3/4
No. 3						
.....lb.	.05 3/4	.05 3/4	.05 3/4	.05 3/4	.04 3/4	.05 3/4
Chips						
.....lb.	.09 3/4	.09 3/4	.09 3/4	.08 3/4	.09 3/4	
Dust						
.....lb.	.04 3/4	.04 3/4	.05 3/4	.04 3/4	.05 3/4	
Seeds						
.....lb.	.07 3/4	.06 3/4	.07 3/4	.04 3/4	.07 3/4	
Elemi, cons						
.....lb.	.09 3/4	.10 3/4	.09 3/4	.10 3/4	.09 3/4	
Ester						
.....lb.	.07 3/4	.08 3/4	.07 3/4	.08 3/4	.07 3/4	.08 3/4
Gamboge, pipe, cases						
.....lb.	.58	.59	.58	.59	.55	.65
Powd, bbls						
.....lb.	.65	.66	.65	.66	.65	.75
Ghatti, sol. bgs						
.....lb.	.11	.15	.11	.15	.09	.15
Karaya, powd, bbls, xxx						
.....lb.	.24	.25	.24	.25	.23	.25
xx						
.....lb.	.16	.17	.16	.17	.15	.17
No. 1						
.....lb.	.09 3/4	.10	.09 3/4	.10	.08	.10
No. 2						
.....lb.	.08 3/4	.09	.08 3/4	.09	.07	.09
Kauri, NY, San Francisco						
Brown XXX, cases						
.....lb.	.60	.60 1/2	.60	.60 1/2	.60	.60 1/2
BX						
.....lb.	.33	.33 1/2	.33	.33 1/2	.33	.33 1/2
B1						
.....lb.	.21	.21	.19	.21	.19	.19 1/2
B2						
.....lb.	.15 1/2	.14 1/2	.15 1/2	.14 1/2	.15	
B3						
.....lb.	.12	.12 1/2	.12	.12 1/2	.12	.12 1/2
Pale XXX						
.....lb.	.65	.65 1/2	.65	.65 1/2	.65	.65 1/2
No. 1						
.....lb.	.40	.40 1/2	.40	.40 1/2	.40	.40 1/2
No. 2						
.....lb.	.22	.22 1/2	.22	.22 1/2	.22	.22 1/2
No. 3						
.....lb.	.15	.15 1/2	.15	.15 1/2	.15	.15 1/2
Kino, tins						
.....lb.	.70	.80	.70	.80	.70	.80
Mastic						
.....lb.	.57	.58	.56	.60 1/2	.46	.60 1/2
Sandarac, prime quality, 200 lb bgs & 300 lb cks						
.....lb.	.35	.38	.19 1/2	.38	.26 1/4	.35 1/4
Senegal, picked bgs						
.....lb.	.20	.21	.20	.21	.20	.21
Sorts						
.....lb.	.09 3/4	.10 3/4	.09 3/4	.12 1/2	.09 3/4	.12 1/2
Thus, bbls 280 lbs.						
.....lb.	11.50	11.00	11.50	10.50	11.00	
Strained						
.....lb.	11.50	11.00	11.50	10.50	11.00	
Tragacanth, No. 1, cases						
.....lb.	1.75	1.80	1.20	1.80	1.15	1.30
No. 2						
.....lb.	1.65	1.70	1.10	1.70	1.05	1.20
No. 3						
.....lb.	1.50	1.55	.95	1.55	.95	1.05
No. 4						
.....lb.	1.40	1.45	.85	1.45	.85	.95
No. 5						
.....lb.	1.30	1.35	.75	1.35	.75	.85
No. 6, bgs						
.....lb.	.30	.31	.18	.31	.14	.19
Sorts						
.....lb.	.30	.35	.25	.30	.11	.25
Yacca, bgs						
.....lb.	.03 1/4	.03 3/4	.03 1/4	.03 3/4	.03 1/4	.03 3/4

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LACQUER AND CHEMICAL INDUSTRIES



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Butyl Acetate, Nor. & Sec.
Butyl Alcohol, Nor. & Sec.
Amyl Acetate: All Grades
Amyl Alcohol

Refined Fusel Oil
Butyl Propionate
Butyl Stearate

Phthalates:
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Diethyl Diamyl
Acetate

Diacetate Triacetate
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ESTABLISHED 1849**

Helium

Meta-nitro-paratoluidine

Prices

	Current Market	1936		1935	
		Low	High	Low	High
Helium, cyl (200 cu. ft.) cyl.	25.00		25.00		25.00
Hematite crystals, 400 lb bbls lb. ....	.16	.18	.16	.18	.16
Paste, 500 bbls .....lb. ....	.11		.11		.11
Hemlock, 25%, 600 lb bbls, wks .....lb. ....	.027½		.027½		.027½
Hexalene, 50 gal drs, wks lb. ....	.30		.30		.30
Hexane, normal 60-70°C.					
Group 3, tks .....gal. ....	.12		.12		.14
Hexamethylenetetramine, drs .....lb. ....	.37	.39	.37	.39	.37
Hexyl Acetate, delv, drs .....lb. ....	.12	.12½	.12	.12½	.12½
Hoof Meal, f.o.b. Chicago unit tks .....lb. ....	.11½		.11½		.11½
Hydrogen Peroxide, 100 vol, 140 lb clys .....lb.	2.80	3.00	2.35	3.00	2.50
Hydroxylamine Hydrochloride, 140 lb clys .....lb. ....	.20	.21	.20	.21	.20
Hypernic, 510, 600 lb bbls lb.	3.15		3.15		3.15
Indigo, Madras, bbls .....lb. ....	.17	.20	.17	.20	.20
20% paste, drs .....lb.	1.25	1.30	1.25	1.30	1.30
Synthetic, liquid .....lb. ....	.15	.18	.15	.18	.18
Iodine, Resublimed, kgs .....lb. ....	.13	.14	.13	.14	.12
Irish Moss, ord, bales .....lb.	1.50	1.55	1.50	1.75	1.90
Bleached, prime, bales .....lb. ....	.09	.10	.09	.10	.09
Iron Acetate Liq. 170 bbls lb. ....	.18	.19	.18	.19	.19
Chloride see Ferric Chloride. ....	.03	.04	.03	.04	.03
Nitrate, coml, bbls .....100 lb.	2.75	3.25	2.75	3.25	3.25
Oxide, English .....lb. ....	.07½	.08½	.07½	.08½	.07½
Isobutyl Carbinol (128-132°C) drs, wks .....lb. ....	.33	.34	.33	.34	.33
Isopropyl Acetate, tks, frt allowed .....lb. ....	.32		.32		.32
dr, frt allowed .....lb. ....	.06½	.06	.07½	.07½	.07½
Ether, see Ether, isopropyl. ....	.07½	.08	.07	.09	.08½
Keiselguhr, 95 lb bgs, NY, Brown .....ton	60.00	70.00	60.00	70.00	60.00
Lead Acetate, brown, broken, f.o.b. NY, bbls .....lb. ....	.09½		.09½		.09½
White, broken, bbls .....lb. ....	.11		.11		.11
cryst, bbls .....lb. ....	.10½		.10½		.10½
gran, bbls .....lb. ....	.11		.11		.11
powd, bbls .....lb. ....	.11½		.11½		.11½
Arsenate, East, jobbers, drs .....lb. ....	.09	.09½	.09	.09½	.09
Dealers, drs .....lb. ....	.09½	.10½	.09½	.10½	.09½
West, jobbers, drs .....lb. ....	.09		.09		.09
Dealers, drs .....lb. ....	.10		.10		.10
Linoleate, solid, bbls .....lb. ....	.26	.26½	.26	.26½	.26
Metal, c-l, NY .....100 lb.	4.60	4.50	4.60	3.50	4.50
Red, dry, 95% Pb ₂ O ₄ , delv .....lb. ....	.0735		.07	.08	.06
97% Pb ₂ O ₄ , delv .....lb. ....	.0760		.07½	.08½	.06½
98% Pb ₂ O ₄ , delv .....lb. ....		.0810	.07½	.08½	.06½
Nitrate, 500 lb bbls, wks lb. ....	.09	.09½	.09	.09½	.10
Oleate, bbls .....lb. ....	.15	.16	.15	.16	.15
Resinate, precip, bbls .....lb. ....	.14		.14		.14
Stearate, bbls .....lb. ....	.22	.23	.22	.23	.22
White, 500 lb bbls, wks .....lb. ....	.06½	.07	.06½	.07	.06½
Sulfate, 500 lb bbls, wks lb. ....		.06		.06	
Lime, chemical quicklime, f.o.b., wks, bulk .....ton	7.00	7.25	7.00	7.25	7.00
Hydrated, f.o.b., wks .....ton	9.00	12.00	8.50	12.00	8.50
Lime Salts, see Calcium Salts.					
Lime sulfur, dealers, tks .....gal. ....	.13	.16	.13	.16	.10½
Dry, bgs, jobbers .....lb. ....	.07½	.10½	.07½	.10½	.11
Linseed Meal, bgs .....ton	40.50	29.00	40.50	25.50	40.00
Litharge, coml, delv, bbls .....lb. ....	.0610	.07	.06	.07	.05
Lithopone, dom, ordinary, delv, bgs .....lb. ....	.04½	.04½	.04½	.04½	.04½
bbls .....lb. ....	.04½	.05	.04½	.05	.04½
High strength, bgs .....lb. ....	.06	.06½	.06	.06½	.06
bbls .....lb. ....	.06½	.06½	.06½	.06½	.06½
Titanated, bgs .....lb. ....	.06	.06½	.06	.06½	.06
bbls .....lb. ....	.06½	.06½	.06½	.06½	.06½
Logwood, 510, 600 lb bbls lb. ....	.06½	.10½	.06½	.10½	.08½
Solid, 50 lb boxes .....lb. ....	.13½	.17½	.13½	.17½	.17½
Sticks .....ton	24.00	26.00	24.00	26.00	24.00
Madder, Dutch .....lb. ....	.22	.25	.22	.25	.22
Magnesite, calc, 500 lb bbl ton	60.00	65.00	60.00	65.00	60.00
Magnesium Carb, tech, 70 lb bgs, wks .....lb. ....	.06	.06½	.06	.06½	.06
Chloride flake, 375 lb drs, c-l, wks .....ton	36.00	39.00	36.00	39.00	36.00
Magnesium fluosilicate, crys, 400 lb bbls, wks .....lb. ....	.10	.10½	.10	.10½	.10
Oxide, USP, light, 100 lb bbls .....lb. ....	.42		.42		.42
Heavy, 250 lb bbls .....lb. ....	.50		.50		.50
Palmitate, bbls .....lb. ....	.23	.24	.23	.24	.22
Stearate, bbls .....lb. ....	.20	.22	.20	.22	.19
Linoleate, lig drs .....lb. ....	.18	.19	.18	.19	.18
Resinate, fused, bbls .....lb. ....	.08½	.08½	.08½	.08½	.08½
precip, bbls .....lb. ....	.12		.12		.12
Manganese Borate, 30%, 200 lb bbls .....lb. ....	.15	.16	.15	.16	.15
Chloride, 600 lb cks .....lb. ....	.09	.12	.09	.12	.09
Dioxide, tech (peroxide), paper bgs, c-l .....ton	47.50		47.50	45.00	50.00
Mangrove, 55%, 400 lb bbls lb. ....	.04		.04		.04
Bark, African .....ton	26.00	26.00	27.00	26.00	30.00
Marble Flour, blk .....ton	12.00	13.00	12.00	13.00	12.00
Mercuric chloride .....lb.	1.14	.81	1.14	.71	.93
Mercury metal .....76 lb. flasks	90.00	94.00	73.50	94.00	69.00
Meta-nitro-aniline .....lb. ....	.67	.69	.67	.69	.67
Meta-nitro-paratoluidine 200 lb bbls .....lb.	1.40	1.55	1.40	1.55	1.40

Current

Meta-phenylene-diamine Orthodichlorobenzene

	Current Market	1936 Low High	1935 Low High
Meta-phenylene-diamine 300			
lb bbls .....	.80 .84	.80 .84	.80 .84
Peroxide, 100 lb cs	1.20 1.25	1.20 1.25	1.20 1.25
Silicofluoride, bbls .....	.09 .10	.09 .10	.09 .10
Stearate, bbls .....	.19 .20	.19 .20	.19 .20
Meta-toluene-diamine, 300 lb			
bbls .....	.67 .69	.67 .69	.67 .69
Methanol, 95%, frt allowed,			
drs .....	.37½ .58	.37½ .58	.37½ .58
97% frt allowed, drs gal. o	.33 .36½	.33 .36½	.33 .36½
97% frt allowed, drs gal. o	.38½ .59	.38½ .59	.38½ .59
Pure, frt allowed, drs gal. o	.34 .37½	.34 .37½	.34 .37½
Synthetic, frt allowed,			
drs .....	.40 .61	.40 .61	.40 .61
Methyl Acetate, dom, 98-			
100%, drs .....	.16 .17½	.11 .18½	.18 .18½
Synthetic, 410 lb drs .....	.16 .17	.16 .17	.16 .17
Acetone, frt allowed,			
drs .....	.52½ .68½	.48½ .68½	.49½ .73½
Synthetic, frt allowed, east			
of Rocky M., drs gal. p	.57½ .60	.57½ .60	.57½ .60
West of Rocky M., frt			
allowed, drs gal. p	.66 .69	.66 .69	.66 .69
Hexyl Ketone, pure, drs lb.			
Anthraquinone .....	.65 .67	.65 .67	.65 .67
Butyl Ketone, tks .....	.10½ .10½	.10½ .10½	.10½ .10½
Chloride, 90 lb cyl .....	.45 .45	.45 .45	.45 .45
Ethyl Ketone, tks .....	.07½ .07½	.07½ .07½	.07½ .07½
Propyl carbinol, drs .....	.60 .75	.60 .75	.60 .75
Mica, dry grd, bgs, wks	35.00 35.00	35.00 35.00	35.00 35.00
Michler's Ketone, kgs	2.50 2.50	2.50 2.50	2.50 2.50
Molasses, blackstrap, tks,			
f.o.b. NY .....	.07 .07½	.07 .08½	.07½ .08½
Monoamylamine, drs, wks lb.			
Monochlorobenzene, see			
Chlorobenzene, mono.			
Monoethanolamine, tks, wks lb.			
Monomethylparaminosulfate,			
100 lb drs	3.75 4.00	3.75 4.00	3.75 4.00
Myrobals 25%, liq bbls .....	.04½ .04½	.04½ .04½	.04½ .04½
50% Solid, 50 lb boxes lb.	.06 .06½	.06 .06½	.06 .06½
J1 bgs	24.00 22.75	24.00 23.50	27.00 27.00
J2 bgs	15.00 14.50	15.00 15.00	15.75 15.75
R2 bgs	14.50 14.00	14.50 16.00	16.50 16.50
Naphtha, v.m.&p. (deodorized)			
see petroleum solvents.			
Naphtha, Solvent, water-white,			
drs, c-l .....	.31 .36	.31 .36	.26 .31
Naphthalene, dom, crude, bgs,			
wks	2.75 2.75	4.50 1.65	3.00 3.00
Imported, cif, bgs	nom. . . .	1.90 3.00	3.00 3.00
Dyestuffs, bgs, bbls, Eastern			
wks .....	.06 .07	.06 .07	.04½ .07
Balls, flakes, pks .....	.08 .08	.08 .08	.08 .08
Balls, ref'd, bbls, Eastern			
wks .....	.07½ .06½	.07½ .04½	.06½ .06½
Flakes, ref'd, bbls, Eastern			
wks .....	.07½ .06½	.07½ .04½	.06½ .06½
Dyestuffs, bgs, bbls, Mid-			
West wks .....	.06½ .07½	.06½ .07½	.04½ .07½
Balls, ref'd, bbls, Mid-West			
wks .....	.07½ .07½	.07½ .05	.07½ .07½
Flakes, ref'd, bbls, Mid-			
West wks .....	.07½ .07½	.07½ .05	.07½ .07½
Nickel Carbonate, bbls .....	.36 .36	.36 .36	.36 .36
Chloride, bbls .....	.18 .19	.18 .19	.18 .19
Oxide, 100 lb kgs, NY .....	.35 .37	.35 .37	.35 .37
Salt, 400 lb bbls, NY .....	.13 .13½	.13 .13½	.12½ .13½
Single, 400 lb bbls, NY .....	.13 .13½	.13 .13½	.11½ .13½
Metal ingot .....	.35 .35	.35 .35	.35 .35
Nicotine, free 50%, 8 lb tins,			
cases	8.25 10.15	8.25 10.15	8.25 10.15
Sulfate, 55 lb drs .....	.75 1.17	.75 1.17	.67 .80
Nitre Cake, blk	12.00 14.00	12.00 14.00	12.00 14.00
Nitrobenzene, redistilled, 1000			
lb drs, wks .....	.09 .11	.09 .11	.09 .11
Nitrocellulose, c-l c-l, wks lb.			
Nitrogenous Mat'l, bgs, impunit			
dom, Eastern wks	2.85 2.85	2.85 2.20	2.75 2.40
dom, Western wks	nom. 1.85	2.10 1.90	2.30 2.30
Nitronaphthalene, 550 lb bbls lb.	.24 .25	.25 .24	.25 .25
Nutgalls Aleppy, bgs .....	.16 .18	.18 .12	.18 .18
Chinese, bgs .....	.19 .20	.19 .20	.19 .20
Oak Bark Extract, 25%, bbls lb.			
Octyl Acetate, tks, wks .....	.15 .15	.15 .15	.15 .15
Orange-Mineral, 1100 lb cks			
NY .....	.10 .10½	.10½ .09½	.10½ .10½
Orthoaminophenol, 50 lb kgs lb.	2.15 2.25	2.15 2.25	2.15 2.25
Orthoanisidine, 100 lb drs lb.	.50 .65	.50 .65	.50 .65
Orthochlorophenol, drs .....	.13 .15	.13 .15	.13 .15
Orthocresol, drs .....	.13 .15	.13 .15	.13 .15
Orthodichlorobenzene, 1000			
lb drs .....	.06½ .11½	.05½ .11½	.05½ .06

o Country is divided in 5 zones, prices varying by zone. In drum prices range covers both zone and c-l and lcl quantities in the 5 zones; in each case, bbl. prices are 2½¢ higher; synthetic is not shipped in bbls.; p Country is divided into 5 zones. Also see footnote directly above; q Naphthalene quoted on Pacific Coast F.A.S. Phila. or N. Y.



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NEW YORK CITY

Orthonitrochlorobenzene Phloroglucinol

Prices

	Current Market		1936		1935	
			Low	High	Low	High
Orthonitrochlorobenzene, 1200 lb drs, wks	.28	.29	.28	.29	.28	.29
Orthonitrotoluene, 1000 lb drs, wks	.07	.10	.07	.10	.05½	.10
Orthonitrophenol, 350 lb drs	.52	.80	.52	.80	.52	.80
Orthotoluidine, 350 lb bbls, l-c-l	.14½	.15	.14½	.15	.14½	.15
Orthonitroparachlorphenol, tins	.70	.75	.70	.75	.70	.75
Osage Orange, cryst	.17	.25	.17	.25	.17	.25
51 deg liquid	.07	.07¾	.07	.07¾	.07	.07¾
Powd, 100 lb bgs	.14½	.15	.14½	.15	.14½	.15
Paraffin, rfd, 200 lb cs slabs						
122-127 deg M P	.0445	.04½	.0445	.04½	.04	.04½
128-132 deg M P	.04¾	.049	.04¾	.049	.05	.0515
133-137 deg M P	.05½	.05¾	.05½	.05¾	.0575	.06
Para aldehyde, 110-55 gal drs	.16	.18	.16	.18	.16	.18
Aminoacetanilid, 100 lb kgs	...	.85	...	.85	...	.85
Aminohydrochloride, 100 lb kgs	1.25	1.30	1.25	1.30	1.25	1.30
Aminophenol, 100 lb kgs lb	...	1.05	...	1.05	...	1.05
Chlorophenol, drs	.50	.65	.50	.65	.50	.65
Coumarone, 330 lb drs	...	...	...	...	...	...
Cymene, rfd, 110 gal dr	2.25	2.50	2.25	2.50	2.25	2.50
Dichlorobenzene, 150 lb bbls wks	.16	.20	.16	.20	.16	.20
Formaldehyde, bbls, wks lb	.38	.39	.38	.39	.38	.39
Nitroacetanilid, 300 lb bbls	.45	.52	.45	.52	.45	.52
Nitroaniline, 300 lb bbls, wks	.47	.51	.47	.51	.48	.55
Nitrochlorobenzene, 1200 lb drs, wks	.23½	.24	.23½	.24	.23½	.24
Nitro-orthotoluidine, 300 lb bbls	2.75	2.85	2.75	2.85	2.75	2.85
Nitrophenol, 185 lb bbls lb	.45	.50	.45	.50	.45	.50
Nitrosodimethylaniline, 120 lb bbls	.92	.94	.92	.94	.92	.94
Nitrotoluene, 350 lb bbls lb	.36	.37	.36	.37	.35	.37
Phenylenedamine, 350 lb bbls	1.25	1.30	1.25	1.30	1.25	1.30
Para Tertiary amyl phenol, wks, drs, c-l	...	.26	.26	.50	.32	.50
Toluenesulfonamide, 175 lb bbls	.70	.75	.70	.75	.70	.75
tk, wks	...	.31	...	.31	...	.31
Toluenesulfonchloride, 410 lb bbls, wks	.20	.22	.20	.22	.20	.22
Toluidine, 350 lb bbls, wks	.58	.60	.58	.60	.56	.60
Paris Green, Arsenic Basis	...	...	...	...	...	...
100 lb kgs	...	.24	...	.24	...	.24
250 lb kgs	...	.22	...	.22	...	.22
Perchlorethylene, 50 gal drs	...	.15	...	.15	...	.15
Persian Berry Ext, bbls	.55	Nom.	.55	Nom.	.55	Nom.
Pentane, normal, 28-38°C, group 3, tks	...	.09	...	.09	...	.09
dr, group 3	.10	.15	.10	.15	.10	.15
Petrolatum, dark amber, bbls	...	.02½	...	.02½	...	.02
Light, bbls	...	.03½	...	.03½	...	.03½
Medium, bbls	...	.02½	...	.02½	...	.02½
Dark green, bbls	...	.02½	...	.02½	...	.02½
White, lily, bbls	...	.06	...	.06	...	.05½
White, snow, bbls	...	.07	...	.07	...	.06½
Red, bbls	...	.02½	...	.02½	...	.02½
Petroleum Ether, 30-60°, group 3, tks	...	.13	...	.13	...	.13
dr, group 3	.15	.16	.15	.16	.15	.16
PETROLEUM SOLVENTS AND DILUENTS						
Cleaners naphthas, group 3, tks, wks	.07¾	.07½	.07¾	.07½	.06¾	.07¼
Bayonne, tks, wks	...	.09½	.09	.09½	...	.09
West Coast, tks	...	.15	...	.15	...	.15
Hydrogenated, naphthas, frt allowed East, tks	...	.16	.15	.16	.15	.17½
No. 2, tks	...	.18	...	.18	.18	.22½
No. 3, tks	...	.15	...	.15	.15	.17½
No. 4, tks	...	.18	...	.18	.18	.22½
Lacquer diluents, tks	...	...	...	...	...	...
Bayonne	.12	.12½	.12	.12½	.12	.12½
Group 3, tks	.08¾	.08½	.08¾	.08½	.07¾	.08
Naphtha, V.M.P., East, tks, wks	...	.10	.09	.10	...	.09
Group 3, tks, wks	.07¾	.07½	.07¾	.07½	.06¾	.07¼
Petroleum thinner, East, tks, wks	...	.09	.09	.09½	...	.09
Group 3, tks, wks	.06¾	.06¾	.06¾	.06¾	.05¾	.06¼
Rubber Solvents, stand grd, East, tks, wks	...	.09½	.09	.09½	...	.09
Group 3, tks, wks	.07¾	.07½	.07¾	.07½	.06¾	.07¼
Stoddard Solvent, East, tks, wks	...	.09½	.09	.09½	...	.09
Group 3, tks, wks	.06¾	.07	.06¾	.07	.06¾	.07
Phenol, 250-100 lb drs	.14¾	.15	.14¾	.15	.14¾	.15
Phenyl-Alpha-Naphthylamine, 100 lb kgs	...	1.35	...	1.35	...	1.35
Phenyl Chloride, drs	...	.16	...	.16	...	.16
Phenylhydrazine Hydrochloride	2.90	3.00	2.90	3.00	2.90	3.00
Phloroglucinol, tech, tins	15.00	16.50	15.00	16.50	15.00	16.50
CP, tins	20.00	22.00	20.00	22.00	20.00	22.00

Current

Phosphate Rock Rosin Oil

	Current Market	1936 Low High	1935 Low High
Phosphate Rock, f.o.b. mines			
Florida Pebble, 68% basis			
70% basis	1.85	1.85	1.85 3.40
72% basis	2.35	2.35	2.35 3.90
75-74% basis	2.85	2.85	2.85 4.40
75% basis	3.85	3.85	3.85 5.40
Tennessee, 72% basis	4.35	4.35	4.35 5.50
Phosphorous Oxysulfide 175	4.50	4.50	4.50 4.75
lb cyl	.16	.20	.16 .20
Red, 110 lb cases	.44	.45	.44 .45
Yellow, 110 lb cs, wks	.28	.33	.28 .33
Sesquisulfide, 100 lb cs	.38	.44	.38 .44
Trichloride, cyl	.16	.20	.16 .20
Phthalic Anhydride, 100 lb			
drs, wks	.14½	.15½	.14½ .15½
Pine Oil, 55 gal drs or bbls			
Destructive dist	.44	.46	.44 .50
Steam dist wat wh bbls gal	.64	.65	.64 .65
ths	.59	.59	.59 .59
Straw color, bbls	.59	.59	.59 .59
ths	.54	.54	.54 .54
Pitch Hardwood, wks	15.00	15.00	15.00 20.00
Burgundy, dom, bbls, wks			
Imported	.03½	.03½	.03½ .03½
Coaltar, bbls, wks	.11	.13	.11 .13
Petroleum, see Asphaltum in Gums' Section.	19.00	19.00	19.00 19.00
Pine, bbls	4.00	4.50	4.00 4.50 3.75 4.25
Stearin, drs	.03	.04½	.03 .04½
Platinum, refd	64.00	34.50	64.00 35.00 38.00

POTASH

Potash, Caustic, wks, sol.	.06¼	.06¼	.06¼	.06¼	.06¼
flake	.07	.07½	.07	.07½	.07½
Liquid, tks	.02½	.02½	.02½	.02½	.02½
Manure Salts, imported					
20% basis, blk	12.00	11.00	12.00	8.60	11.00
30% basis, blk	16.50	14.40	16.50	12.90	14.40
Potassium Acetate	.26	.28	.26	.28	.28
Potassium Muriate, 80% basis					
bgs	25.00	22.50	25.00	22.00	22.50
Dom, blk	.50	.45	.50	.40	.45
Pot & Mag Sulfate, 48% basis					
bgs	24.75	22.25	24.75	19.50	22.50
Potassium Sulfate, 90% basis					
bgs	36.25	33.75	36.25	33.75	35.00
Potassium Bicarbonate, USP					
320 lb bbls	.09	.18	.09	.18	.07½ .09
Bichromate Crystals, 725 lb					
cks	.08½	.09	.08½	.09	.08½ .09
Binoxalate, 300 lb bbls	.23	.23	.23	.22	.23
Bisulfate, 100 lb kgs	.15½	.18	.15½	.18	.35 .36
Carbonate, 80-85% calc 800					
lb cks	.07¼	.07¼	.07¼	.07¼	.07¼ .07¼
liquid, tks	.02½	.02½	.02½	.02½	.02½ .02½
drs, wks	.03¼	.03¼	.03¼	.03¼	.03¼ .03¼
Chlorate crys, 112 lb kgs					
wks	.09¼	.09¼	.09¼	.09¼	.09¼ .09¼
gran, kgs	.12	.13	.12	.13	.12 .13
powd, kgs	.08	.08½	.08	.08½	.08½ .09¼
Chloride, crys, bbls	.04	.04¼	.04	.04¼	.04 .04¼
Chromate, kgs	.23	.28	.23	.28	.23 .28
Cyanide, 110 lb cases	.55	.57½	.55	.57½	.55 .57½
Iodide, 75 lb bbls	1.10	1.15	1.10	1.25	1.25 1.40
Metabisulfite, 300 lb bbls					
Oxalate, bbls	.15	.13¼	.15	.15	.15 .15
Perchlorate, cks, wks	.25	.26	.25	.26	.16 .24
Permanganate, USP, crys	.09	.11	.09	.11	.09 .11
500 & 1000 lb drs, wks lb	.18½	.19½	.18½	.19½	.18½ .19½
Prussiate, red, 112 lb kgs	.35	.38¼	.35	.38¼	.35 .38¼
Yellow, 500 lb casks	.18	.19	.18	.19	.18 .19
Tartrate Neut, 100 lb kgs					
Titanium Oxalate, 200 lb					
bbls	.21	.21	.21	.21	.21 .21
Propane, group 3, tks	.32	.35	.32	.35	.32 .35
Pumice Stone, lump bgs	.03	.03	.03	.03	.03 .07
250 lb bbls	.04½	.06	.04½	.06	.04½ .06
Powd, 350 lb bgs	.05	.07	.05	.07	.05 .07
Putty, coml, tubs	.02½	.03	.02½	.03	.02½ .03
Linseed Oil, kgs	2.75	2.75	2.75	2.75	2.75 2.75
Pyridine, 50 gal drs	4.50	4.50	4.50	4.50	4.50 4.50
Pyrites, Spanish cif Atlantic	1.30	1.30	1.30	1.20	1.30 1.30
ports, blk	.12	.13	.12	.13	.12 .13
Pyrocatechin, CP, drs, tins					
Quebracho, 35% liq tks	2.40	2.75	2.40	2.75	2.40 3.00
450 lb bbls, c-l	.02½	.02½	.02½	.02½	.02½ .02½
Solid, 63%, 100 lb bales	.03½	.03½	.03½	.03½	.03½ .03½
cif	.03½	.03½	.03½	.03½	.03½ .03½
Clarified, 64%, bales	.03½	.03½	.03½	.03½	.03½ .03½
Quercitron, 51 deg liq, 450 lb					
bbls	.06	.06½	.06	.06½	.06 .06½
Solid, 100 lb boxes	.10	.12	.10	.12	.10 .12
R Salt, 250 lb bbls, wks	.52	.57	.52	.57	.44 .45
Resorcinol tech, cans	.75	.80	.75	.80	.75 .80
Rochelle Salt, cryst	.14	.14½	.14	.14½	.14 .15
Powd, bbls	.13	.13½	.13	.13½	.13 .13½
Rosin Oil, bbls, first run gal	.50	.52	.50	.52	.45 .48
Second run	.60	.62	.60	.62	.48 .60
Third run, drs					

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Stop them

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DO YOUR PART TO BRING BACK ECONOMY IN GOVERNMENT

Register ... Vote ... Replace the wasters with lawmakers who will SAVE public money.

Rosins Sodium Nitrate

Prices

	Current Market	1936		1935	
		Low	High	Low	High
Rosins 600 lb bbls, 280 lb unit ex. yard NY:					
B.....	7.17½	4.45	7.17½	4.65	5.65
D.....	7.17½	4.95	7.17½	5.02½	5.75
E.....	7.17½	5.15	7.30	5.15	5.90
F.....	7.17½	5.40	7.30	5.20	5.95
G.....	7.22½	5.50	7.30	5.25	6.00
H.....	7.22½	5.60	7.30	5.25	6.00
I.....	7.22½	5.70	7.30	5.25	6.00
K.....	7.22½	5.55	7.30	5.27½	6.05
M.....	7.25	5.60	7.30	5.35	6.10
N.....	7.25	5.70	7.35	5.75	6.40
WG.....	7.35	5.85	7.70	5.95	6.87½
WW.....	8.15	5.90	8.45	6.25	7.55
Rosins, Gum, Savannah (280 lb unit):					
B.....	5.97½	3.15	5.97½	3.40	4.40
D.....	5.97½	3.75	5.97½	3.70	4.50
E.....	5.97½	3.90	6.05	3.90	4.65
F.....	5.97½	4.10	6.05	3.95	4.70
G.....	5.97½	4.20	6.05	4.00	4.75
H.....	5.97½	4.30	6.05	4.00	4.75
I.....	5.97½	4.30	6.05	4.00	4.75
K.....	5.97½	4.35	6.05	4.02½	4.80
M.....	6.00	4.35	6.05	4.10	4.85
N.....	6.00	4.45	6.10	4.50	5.15
WG.....	6.10	4.45	6.45	4.70	5.60
WW.....	6.90	4.55	7.20	5.15	6.25
X.....	6.90	4.55	7.20	5.20	6.25
Rosins, Wood, wks (280 lb unit), wks, FF					
I.....	...	6.05	6.15	4.05	6.35
M.....	...	6.40	6.40	4.30	7.00
N.....	...	6.60	6.60	4.55	7.25
NY.....	...	7.10	7.10	5.00	7.75
Rosin, Wood, c-l, FF grade, NY					
.....	6.77	6.10	7.35	4.92	5.62
Rotten Stone, bgs mines. ton					
.....	35.00	...	35.00	23.50	35.00
Lump, imported, bbls. lb.					
.....	.05	.07	.05	.07	.07
Selected, bbls. lb.					
.....	.08	.10	.08	.10	.10
Powdered, bbls. lb.					
.....	.02½	.05	.02½	.05	.05
Sago Flour, 150 lb bgs. lb.					
.....	.02¾	.03¾	.02¾	.03¾	.03¾
Sal Soda, bbls, wks. 100 lb.					
.....	1.15	1.15	1.30	...	1.30
Salt Cake, 94-96%, c-l, wks ton					
.....	19.00	23.00	19.00	23.00	13.00
Chrome, c-l, wks. ton					
.....	12.00	13.00	11.00	13.00	12.00
Saltpetre, double refd, gran, 450-500 lb bbls. lb.					
.....	.059	.06¼	.059	.06¼	.06¼
Powd, bbls. lb.					
.....	.069	.07¾	.069	.07¾	.069
Cryst, bbls. lb.					
.....	.069	.08	.069	.08	.08
Satin, White, 550 lb bbls. lb.					
.....	...	.01½	...	.01½	...
Shellac, Bone dry, bbls. lb. r					
.....	.18	.19	.18	.26½	.19
Garnet, bgs. lb. s					
.....	.16	.17	.16	.20	.17
Superfine, bgs. lb. s					
.....	.15½	.17	.15½	.18	.16
T. N., bgs. lb. s					
.....	.14½	.15½	.14	.16	.13
Schaeffer's Salt, kgs. lb. s					
.....	.48	.50	.48	.50	.48
Silver Nitrate, vials. oz.					
.....	...	.32¾	...	.32¾	.36¾
Slate Flour, bgs, wks. ton					
.....	9.00	10.00	9.00	10.00	9.00
Soda Ash, 58% dense, bgs, c-l, wks. 100 lb.					
.....	1.25	...	1.25	...	1.25
58% light, bgs. 100 lb.					
.....	1.23	...	1.23	...	1.23
blk. 100 lb.					
.....	1.05	...	1.05	...	1.05
paper bgs. 100 lb.					
.....	1.20	...	1.20	...	1.20
bbls. 100 lb.					
.....	1.50	...	1.50	...	1.50
Soda Caustic, 76% grnd & flake, drs. 100 lb.					
.....	3.00	...	3.00	...	3.00
76% solid, drs. 100 lb.					
.....	2.60	...	2.60	...	2.60
Liquid sellers, tks, 100 lbs.					
.....	2.25	...	2.25	...	2.25
Sodium Abietate, drs. lb.					
.....	.08	...	.08	...	.08
Acetate, tech, 450 lb bbls, wks. lb.					
.....	.04½	.05	.04½	.05	.04½
Alignate, drs. lb.					
.....	.64	...	.64	...	.64
Antimonate, bbls. lb.					
.....	.12	.12½	.12	.14	...
Arsenate, drs. lb.					
.....	...	.10½	...	.10½	...
Arsenite, lig, drs. gal.					
.....	.40	.75	.40	.75	.40
Benzoate, USP, kgs. lb.					
.....	.46	.48	.46	.48	.46
Bicarb. 400 lb bbl, wks 100 lb.					
.....	1.85	...	1.85	...	1.85
Bichromate, 500 lb cks, wks lb.					
.....	.06¼	.07	.06¼	.07	.06¼
Bisulfite, 500 lb bbl, wks lb.					
.....	.03¼	.036	.03¼	.036	.03¼
35-40% solchys, wks 100 lb.					
.....	1.95	2.10	1.95	2.10	1.95
Chlorate, bgs, wks. lb.					
.....	.06¼	.07½	.06¼	.07½	.06¼
Chloride, tech. ton					
.....	13.60	16.50	13.60	16.50	13.60
Cyanide, 96-98%, 100 & 250 lb drs, wks. lb.					
.....	.15½	.17½	.15½	.17½	.15½
Fluoride, 90%, 300 lb bbls, wks. lb.					
.....	.07½	.08¼	.07½	.08¼	.07½
Hydrosulfite, 200 lb bbls, f.o.b. wks. lb.					
.....	.17	.18	.17	.19	.18
Hyposulfite, tech, pea crys 375 lb bbls, wks 100 lb.					
.....	2.50	3.00	2.50	3.00	2.50
Tech, reg crys, 375 lb bbls, wks. 100 lb.					
.....	2.40	2.75	2.40	2.75	2.40
Iodide. lb.					
.....	1.90	1.95	1.90	2.05	2.00
Metanilate, 150 lb bbls. lb.					
.....	.41	.42	.41	.42	.41
Metasilicate, gran, c-l, wks 100 lb.					
.....	2.30	3.00	2.30	3.00	2.65
cryst, bbls, wks. 100 lb.					
.....	...	2.90	...	3.25	...
Monohydrate, bbls. lb.					
.....	...	.023	...	.023	...
Naphenate, drs. lb.					
.....	...	.09	...	.09	...
Naphthionate, 300 lb bbl lb.					
.....	.52	.54	.52	.54	.52
Nitrate, 92%, crude, 200 lb bgs, c-l, NY. ton					
.....	...	25.80	24.80	25.80	...
100 lb bgs. ton					
.....	...	26.50	25.50	26.50	...
Bulk. ton					
.....	...	24.50	23.50	24.50	...

* Bone dry prices at Chicago 1c higher; Boston ½c; Pacific Coast 3c; Philadelphia deliveries f.o.b. N. Y.; refined 6c higher in each case; s T. N. and Superfine prices quoted f.o.b. N. Y. and Boston; Chicago prices 1c higher; Pacific Coast 3c; Philadelphia f.o.b. N. Y.

Current

Sodium Nitrite Terpineol

	Current Market	1936		1935	
		Low	High	Low	High
Sodium (continued):					
Nitrite, 500 lb bblslb.	.0710	.08	.0710	.08	.07¼ .08
Orthochlorotoluene, sulfon- ate, 175 lb bbls, wks. .lb.	.25	.27	.25	.27	.25 .27
Perborate, 275 lb bbls . .lb.	.17	.18	.17	.18	.17 .19
Peroxide, bbls, 400 lb . .lb.	...	.17	...	.17	... .17
Phosphate, di-sodium, tech, 310 lb bbls, wks 100 lb.	...	2.10	2.10	2.30	2.20 2.30
bgs, wks100 lb.	...	1.90	1.90	2.10	2.00 2.10
tri-sodium, tech, 325 lb bbls, delv100 lb.	...	2.20	2.20	2.30	2.30 2.70
bgs, delv100 lb.	...	2.00	2.00	2.10	2.10 2.60
Picramate, 160 lb kgs . .lb.	.67	.69	.67	.69	.67 .69
Prussiate, Yellow, 350 lb bbl, wkslb.	.11½	.12	.11½	.12	.11½ .12
Pyrophosphate, anhyd, 100 lb bblslb.	.102	.132	.102	.132	.102 .15
Silicate, 60°, 55 gal drs, wks100 lb.	1.65	1.70	1.65	1.70	1.65 1.70
40°, 35 gal drs, wks 100 lb.	...	.80	...	.80	... .80
tk, wks100 lb.	...	.65	...	.65	... .65
Silicofluoride, 450 lb bbls NYlb.	.07	.07¼	.05¼	.07¼	.04¼ .05
Stannate, 100 lb drs . . .lb.	.28½	.29	.28½	.34	.31 .38
Stearate, bblslb.	.22	.26	.21	.26	.20 .25
Sulfanilate, 400 lb bbls .lb.	.16	.18	.16	.18	.16 .18
Sulfate Anhyd, 550 lb bbls c-l, wks100 lb. ‡	1.30	1.55	1.30	1.55	1.25 2.35
Sulfide, 80% cryst, 440 lb bbls, wkslb.	...	.02¼	...	.02¼	... .02¼
62% solid, 650 lb drs, c-l, wkslb.	...	.03	...	.03	... .03
Sulfite, cryst, 400 lb bbls, wkslb.	.023	.02¼	.023	.02¼	.023 .02½
Sulfocyanide, bblslb.	.28	.47	.28	.47	.32 .42½
Sulfuricinate, bbls . . .lb.	...	.12	...	...	... .12
Tum-stite, tech, crys, kgs lb.	.85	.90	.85	.90	... .90
Sorbitol, com., drs, basis content, wkslb.	...	.25	...	...	... .25
Spruce Extract, ord, tks. .lb.	...	.01	...	.01	... .01
Ordinary, bblslb.	...	.01½	...	.01½	... .01½
Super spruce ext, tks. .lb.	...	.01½	...	.01½	... .01½
Super spruce ext, bbls. .lb.	...	.01½	...	.01½	... .01½
Super spruce ext, powd, bgslb.	...	.04	...	.04	... .04
Starch, Pearl, 140 lb bgs 100 lb.	4.04	4.15	2.99	4.30	3.13 3.78
Powd, 140 lb bgs.100 lb.	4.16	4.36	3.09	4.54	3.23 3.66
Potato, 200 lb bgs.lb.	.04½	.05½	.04½	.05½	.04½ .06
Imp, bgslb.	.05	.06	.05	.06	.05¼ .06½
Rice, 200 lb bblslb.	...	.07¼	...	.07¼	.07¼ .08½
Wheat, thick, bgslb.	...	.08¼	...	.08¼	... .08¼
Sroutium carbonate, 600 lb bbls, wkslb.	.07¼	.07½	.07¼	.07½	.07¼ .07½
Nitrate, 600 lb bbls, NY lb.	.08¾	.09½	.08¾	.09½	.08¾ .09½
Sucrose octa-acetate, den, grd, bbls, wkslb.	.45	...	.45	...	... .45
tech, bbls, wkslb.	.40	...	.40	...	... .40
Sulfur					
Crude, f.o.b. mines . . .ton	18.00	19.00	18.00	19.00	18.00 19.00
Flour, coml, bgs100 lb.	1.60	2.35	1.60	2.35	1.60 2.35
bbls100 lb.	1.95	2.70	1.95	2.70	1.95 2.70
Rubbermakers, bgs100 lb.	2.20	2.80	2.20	2.80	2.20 2.80
bbls100 lb.	2.55	3.15	2.55	3.15	2.55 3.15
Extra fine, bgs100 lb.	2.40	3.00	2.40	3.00	2.40 3.00
Superfine, bgs100 lb.	2.20	2.80	2.20	2.80	2.20 2.80
bbls100 lb.	2.25	3.10	2.25	3.10	2.25 3.10
Flowers, bgs100 lb.	3.00	3.75	3.00	3.75	3.00 3.75
bbls100 lb.	3.35	4.10	3.35	4.10	3.35 4.10
Roll, bgs100 lb.	2.35	3.10	2.35	3.10	2.35 3.10
bbls100 lb.	2.50	3.25	2.50	3.25	2.50 3.25
Sulfur Chloride, red, 700 lb drs, wkslb.	.05	.05½	.05	.05½	.05 .05½
Yellow, 700 lb drs, wks lb.	.03¼	.04½	.03¼	.04½	.03¼ .04½
Sulfur Dioxide, 150 lb cyl lb.	.06½	.08½	.06½	.08½	.08½ .10
Multiple units, wks . . .lb.	.05¼	.06	.05¼	.06	... .06½
tk, wkslb.	.04¼	.04¾	.04¼	.04¾	... .04¾
Refrigeration, cyl, wks . .lb.	.10	.13	.10	.13	... .13
Multiple units, wks . . .lb.	.07	.09½	.07	.09½	... .09½
Sulfuryl Chloridelb.	.15	.40	.15	.40	.15 .40
Sumac, Italian, grd . . .ton	...	60.00	52.00	60.00	50.00 65.00
dom, bgs, wkston	...	35.00	...	35.00	... 35.00
Extract, 42°, bblslb.	.04½	.16½	...	...	... .16½
Superphosphate, 16% bulk, wkston	...	8.00	8.00	8.25	8.25 8.50
Run of pileton	...	7.50	7.50	7.75	7.75 8.00
Talc, Crude, 100 lb bgs, NY	14.00	15.00	14.00	15.00	14.00 15.00
Refd, 100 lb bgs, NY ton	16.00	18.00	16.00	18.00	16.00 18.00
French, 220 lb bgs, NY ton	23.00	30.00	22.00	30.00	22.00 30.00
Refd, white, bgston	45.00	60.00	45.00	60.00	45.00 60.00
Italian, 220 lb bgs to arr ton	70.00	75.00	70.00	75.00	70.00 75.00
Refd, white, bgs, NY ton	75.00	80.00	75.00	80.00	75.00 80.00
Tankage Grd, NY . . .unit	...	4.00	2.65	4.00	2.35 3.00
Ungrdunit	3.00	3.25	2.40	3.25	2.15 2.50
Fert grade, f.o.b. Chicago . .unit	...	3.50	2.40	3.50	2.25 2.65
South American cif. unit	...	3.75	2.70	3.75	2.45 3.15
Tapioca Flour, high grade, bgslb.	.03¼	.05½	.03½	.05½	.0215 .05
Tar Acid Oil, 15%, drs .gal.	.22½	.23½	.22½	.23½	.21 .23½
25%, drsgal.	.24½	.26½	.24½	.26½	.23 .26½
Tar, pine, delv, drs . . .gal.	...	.26	.25	.26	.25 .26
tk, delvgal.	...	.20	...	.20	... .20
Tartar Emetic, tech . . .lb.	.24¼	.25	.24¼	.25	.22¼ .25
USP, bblslb.	.28	.28½	.28	.28½	.28 .28½
Terpineol, den grd, drs .lb.	.13¼	.14¼	.13¼	.14¼	.13¼ .14¼
tklb.	.13	.14	.13	.14	.13 .14

‡ Bags 15c lower; * + 10.

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Sulphuric Acid
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Sulphite Pulp
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Prices

	Current Market	1936		1935	
		Low	High	Low	High
Tetrachlorethane, 50 gal drs lb.	.08	.08 1/2	.08	.08 1/2	.09
Tetralene, 50 gal drs, wks lb.	.12	.13	.12	.13	.13
Thiocarbamid, 170 lb bbl. lb.	.20	.25	.20	.25	.25
Tin, crystals, 500 lb bbls, wks lb.	.35	.35 1/2	.35	.37 1/2	.36
Metal, NY	.45	.40 1/2	.48 1/2	.456	.52 1/2
Oxide, 300 lb bbls, wks lb.	.49	.51	.47	.53	.51
Tetrachloride, 100 lb drs, wks	.23 1/4	.21 1/4	.24 1/4	.24 1/4	.26 1/4
Titanium Dioxide, 300 lb bbls lb.	.17 1/4	.19 1/4	.17 1/4	.19 1/4	.19 1/4
Barium Pigment, bbls lb.	.06 1/4	.06 1/2	.06 1/4	.06 1/2	.06 1/2
Calcium Pigment, bbls lb.	.06 1/4	.06 1/2	.06 1/4	.06 1/2	.06 1/2
Toluol, 110 gal drs, wks gal.	.35	.35	.35	.35	.35
8000 gal tks, frt allowed gal.	.30	.30	.30	.30	.30
Toluidine, mixed, 900 lb drs, wks	.27	.28	.27	.28	.28
Toner Lithol, red, bbls lb.	.75	.80	.75	.80	.80
Para, red, bbls lb.	.75	.75	.75	.75	.75
Toluidine, bgs lb.	1.35	1.35	1.35	1.35	1.35
Triacetin, 50 gal drs, wks lb.	.32	.36	.32	.36	.36
Triamylamine, drs, wks lb.	1.25	1.25	1.25	1.25	1.25
Triamyl Borate, lcl, drs, wks	.27	.27	.27	.27	.27
Trichlorethylene, drs, frt allowed	.089	.094	.089	.094	.09 1/2
Triethanolamine, 50 gal drs wks	.26	.30	.26	.30	.26
tk, wks	.25	.25	.25	.25	.25
Tricresyl Phosphate, drs lb.	.23	.26	.19	.26	.21
Triphenyl Guanidine lb.	.58	.60	.58	.60	.58
Tripoli, airfloat, bgs, wks ton	27.50	30.00	27.50	30.00	27.50
Tungsten, Wolframite per unit	15.00	15.25	15.00	15.25	15.00
Turpentine (Spirits), c-l, NY dock, bbls	.40 1/2	.40 1/2	.50	.43 1/4	.55 1/4
Savannah, bbls	.35 1/2	.35 1/2	.45	.38 1/4	.50 1/4
Jacksonville, bbls	.35 1/4	.35 1/4	.44 1/2	.38 1/4	.50 1/4
Wood Steam dist, bbls, c-l, NY	.39	.38	.47	.43	.50
Urea, pure, 112 lb cases lb.	.14 1/2	.15 1/2	.14 1/2	.17	.15 1/2
Fert grade, bgs, c.i.f. ton	95.00	110.00	95.00	110.00	100.00
c.i.f. S.A. points ton	95.00	110.00	95.00	110.00	120.00
Urea, dom, f.o.b., wks ton	95.00	110.00	95.00	110.00	110.00
Urea Ammonia liq 55% NH ₃ , tks unit	No prices	.96	.96	.96	.96
Valonia beard, 42%, tannin bgs	52.00	55.00	46.00	64.50	40.00
Cups, 32% tannin, bgs ton	35.00	42.00	35.00	42.00	26.00
Mixture, bark, bgs ton	Nom.	Nom.	Nom.	Nom.	32.00
Vanillin, ex eugenol, 100 lb tins	3.75	3.75	3.75	3.75	3.75
Ex-guaiacol lb.	3.65	3.65	3.65	3.65	3.65
Vermillion, English, kgs lb.	1.65	1.72	1.52	1.79	1.48
Vinyl Chloride, 16 lb cyl lb.	1.00	1.00	1.00	1.00	1.00
Wattle Bark, bgs ton	30.00	26.50	30.00	29.00	32.00
Extract, 60%, tks, bbls lb.	.03 1/2	.03 1/2	.03 1/2	.03 1/2	.03 1/2

WAXES

Wax, Bayberry, bgs lb.	.17 1/2	.20	.17 1/2	.20	.17 1/2	.23
Bees, bleached, white 500 lb slabs, cases lb.	.36	.38	.34	.38	.33 1/2	.34
Yellow, African, bgs lb.	.26	.27	.24	.27	.21	.25 1/2
Brazilian, bgs lb.	.27 1/2	.28 1/2	.25	.28 1/2	.21 1/2	.26 1/2
Chilean, bgs lb.	.27 1/2	.28 1/2	.25	.28 1/2	.21 1/2	.26 1/2
Refined, 500 lb slabs, cases lb.	.28	.30	.28	.30	.27 1/2	.28
Candelilla, bgs lb.	.16	.17 1/2	.14	.17 1/2	.10	.17 1/2
Carnauba, No. 1, yellow, bgs lb.	.46	.47 1/2	.43 1/2	.48	.35	.54
No. 2, yellow, bgs lb.	.45	.45 1/2	.42	.46	.34	.51
No. 2, N. C., bgs lb.	.39	.40	.38	.41	.26 1/2	.43 1/2
No. 3, Chalky, bgs lb.	.35	.36 1/2	.34	.38	.21	.42 1/2
No. 3, N. C., bgs lb.	.34 1/2	.35	.34	.41	.22 1/2	.43
Ceresin, white, imp, bgs lb.	.43	.45	.43	.45	.43	.45
Yellow, bgs lb.	.36	.38	.36	.38	.36	.38
Domestic, bgs lb.	.08	.11	.08	.11	.08	.11
Japan, 224 lb cases lb.	.08 1/2	.09	.08	.09	.06	.09
Montan, crude, bgs lb.	.10 1/4	.11 1/4	.10 1/4	.11 1/4	.10 1/4	.11 1/4
Paraffin, see Paraffin Wax						
Spermaceti, blocks, cases lb.	.23	.24	.22	.24	.19	.24
Cakes, cases lb.	.24	.25	.23	.25	.20	.25
Whiting, prec 200 lb bgs, c-l, wks ton	15.00	15.00	15.00	15.00	12.00	15.00
Alba, bgs, c-l, wks ton	11.50	14.50	11.50	15.00	11.50	15.00
Gliders, bgs, c-l, wks ton	18.00	30.00	18.00	30.00	18.00	30.00
Wood Flour, c-l, bgs ton	18.00	30.00	18.00	30.00	18.00	30.00
Xylol, frt allowed, East 10° tks, wks gal.	.33	.33	.33	.33	.27	.33
Coml, tks, wks, frt allowed gal.	.30	.30	.30	.30	.26	.30
Xylidine, mixed crude, drs lb.	.36	.37	.36	.37	.36	.37
Zinc, Carbonate tech, bbls, NY lb.	.09 1/2	.11	.09 1/2	.11	.09 1/2	.11
Chloride fused, 600 lb drs, wks lb.	.04 1/2	.05 1/4	.04 1/2	.05 1/4	.04 1/2	.05 1/4
Gran, 500 lb bbls, wks lb.	.05	.05 1/4	.05	.05 1/4	.05	.05 1/4
Soln 50%, tks, wks lb.	2.00	2.00	2.00	2.00	2.00	2.00
Cyanade, 100 lb drs lb.	.36	.37	.36	.38	.36	.41
Zinc Dust, 500 lb bbls, c-l, dely lb.	.0685	.068	.0755	.057	.0685	.0685
Metal, high grade slabs, c-l, NY lb.	5.225	5.22	5.275	4.05	5.22 1/2	5.22 1/2
E. St. Louis lb.	4.85	4.80	4.90	3.70	4.85	4.85
Oxide, Amer, bgs, wks lb.	.05	.05 1/2	.05	.05 1/2	.05	.06 1/4
French, 300 lb bbls, wks lb.	.05 1/2	.07	.05 1/2	.07	.05 1/2	.10 1/2
Palmitate, bbls lb.	.22	.23	.22	.23	.21	.23
Perborate, 100 lb drs lb.	1.25	1.25	1.25	1.25	1.25	1.25
Peroxide, 100 lb drs lb.	1.25	1.25	1.25	1.25	1.25	1.25
Resinate, fused, dark, bbls lb.	.09	.10	.05 1/4	.10	.05 1/4	.06 1/2
Stearate, 50 lb bbls lb.	.19	.22	.19	.22	.18	.22

Current

	Zinc Sulfate Oil, Whale					
	Current Market		1936 Low	1936 High	1935 Low	1935 High
Zinc Sulfate, crys, 400 lb bbl,						
wks .....	.028	.033	.028	.033	.028	.033
Flake, bbls .....	.032	.035	.032	.035	.032	.035
Sulfide, 500 lb bbls, delv ..	.1034	.1134	.1034	.1134	.1034	.1134
bgs, delv .....	.1034	.1134	.1034	.1134	.1034	.1134
Sulfocarbonate, 100 lb kgs						
.....lb.	.24	.25	.24	.25	.24	.25
Zirconium Oxide, Nat kgs lb.	.0234	.03	.0234	.03	.0234	.03
Pure, kgs .....	.45	.50	.45	.50	.45	.50
Semi-refined, kgs .....	.08	.10	.08	.10	.08	.10

Oils and Fats

Castor, No. 3, 400 lb bbls..lb.	.1034	.1034	.1034	.1034	.0934	.1034
Blown, 400 lb bbls .....	.1234	.13	.1234	.13	.1134	.16
China Wood, bbls spot NY lb.	.1334	.14	.1334	.14	.094	.40
Tks, spot NY .....	...	.132	.132	.19	.088	.35
Coast, tks .....	...	.1434	.132	.18	.087	.24
Coconut, edible, bbls NY..lb.	...	.1034	.0934	.1034	.04	.12
Manila, tks, NY .....	...	.0634	.0434	.0634	.0334	.0634
Tks, Pacific Coast .....	...	.0534	.0334	.0534	.0334	.06
Cod, Newfoundland, 50 gal						
bbls .....	...	.4334	.40	.43	.34	.38
Copra, bgs, NY .....	.0360	...	.0320	.0360	.02	.038
Corn, crude, tks, mills .....	...	.0934	.08	.0934	.0834	.11
Refd, 375 lb bbls, NY .....	.1234	.13	.1034	.13	.1134	.14
Cottonseed, see Oils and Fats News Section.						
Degras, American, 50 gal bbls,						
NY .....	.0534	.06	.0534	.0634	.0434	.06
English, bbls, NY.....lb.	.09	.0934	.0834	.1034	.0434	.0634
Greases, Yellow .....	...	.0634	.0334	.0634	.05	.0634
White, choice bbls, NY lb.	.0634	.0634	.0434	.0834	.0534	.0834
Herring, Coast, tks .....	...	.31	...	.31	.23	.33
Lard Oil, edible, prime .....	...	.1434	.1234	.1434	.0934	.2034
Extra, bbls .....	...	.1034	.0934	.11	.0834	.1134
Extra, No. 1, bbls .....	...	.0934	.0734	.0934	.0834	.11
Linseed, Raw, less than 5 bbl						
lots .....	...	.113	.102	.109	.091	.1130
bbls, c-l, spot .....	...	.0998	.092	.1030	.083	.102
Tks .....	...	.095	.086	.097	.0770	.096
Menhaden, tks, Baltimore gal.	...	.27	.25	.36	.25	.36
Refined, alkali, drs .....	...	.074	.066	.082	.061	.082
Tks .....	...	.068	.062	.072	.055	.072
Light pressed, drs .....	...	.068	.06	.076	.055	.076
Tks .....	...	.062	.056	.066	.049	.066
Kettle bodied, drs .....	...	.084	.08	.096	...	...
Neatsfoot, CT, 20° bbls, NY						
.....lb.	.16	.1634	.16	.1634	.1634	.1634
Extra, bbls, NY .....	...	.10	.08	.0934	.0834	.1134
Pure, bbls, NY .....	...	.1134	.1134	.1234	.1134	.1334
Oiticica, bbls .....	.11	.1234	.11	.1534	.1334	.28
Oleo, No. 1, bbls, NY .....	...	.1134	.0934	.1234	.1034	.1434
No. 2, bbls, NY .....	...	.11	.0834	.12	.10	.1334
Olive, denat, bbls, NY .....	...	1.50	.73	1.50	.82	.95
Edible, bbls, NY	2.20	nom.	1.60	2.25	1.55	1.90
Foots, bbls, NY .....	.0934	.0934	.08	.0934	.0734	.10
Palm, Kernel, bulk .....	...	.05	.0434	.05	...	...
Niger, cks .....	.0470	.05	.04	.05	.034	.0534
Sumatra, tks .....	.0450	.0534	.0334	.0534	...	...
Peanut, crude, bbls, NY .....	...	.0934	.08	.0934	...	...
Tks, f.o.b. mill .....	...	.09	.0734	.0934	.0834	.1034
Refined, bbls, NY .....	...	.1234	.12	.1334	.1234	.14
Perilla, drs, NY .....	.0934	.10	.07	.10	.0734	.1034
Tks, Coast .....	.0934	.0934	.066	.0934	.068	.0834
Pine, see Pine Oil, Chemical Section.						
Rapeseed, blown, bbls, NY lb.	.1134	.12	.086	.12	.0734	.09
Denatured, drs, NY .....	.67	.65	.52	.68	.40	.56
Red, Distilled, bbls .....	.1034	.1134	.0834	.1134	.0734	.1034
Tks .....	...	.0934	.0734	.0934	.0634	.0834
Salmon, Coast, 8000 gal tks						
.....gal.	...	.32	.31	.3234	.25	.35
Sardine, Pac Coast, tks .....	.35	nom.	.28	.39	.2434	.3734
Refined alkali, drs .....	.074	.075	.066	.082	.065	.082
Tks .....	...	.068	.062	.072	.06	.072
Light pressed, drs .....	...	.068	.06	.076	.055	.076
Tks .....	...	.062	.056	.066	.049	.066
Sesame, yellow, dom .....	...	.14	.1234	.1434	.1234	.1534
White, dos .....	.14	.1434	.1234	.1434	.1234	.1534
Soy Bean, crude						
Dom, tks, f.o.b. mills .....	...	.0834	.07	.087	.08	.10
Crude, drs, NY .....	.093	.099	.076	.099	.086	.11
Refd, bbls, NY .....	.098	.107	.081	.107	.091	.115
Tks .....	.092	.097	.0734	.097	.08	.1034
Sperm, 38° CT, bleached, bbls						
NY .....	.094	.096	.094	.101	.099	.101
45° CT, bleached, bbls,						
NY .....	.087	.089	.087	.094	.092	.094
Stearic Acid, double pressed						
dist bgs .....	.1034	.11	.0834	.11	.10	.1234
Double pressed saponified						
bgs .....	.1034	.1134	.09	.1134	.09	.1234
Triple pressed dist bgs..lb.	.1334	.1434	.1134	.1434	.1234	.1534
Stearine, Oleo, bbls .....	.10	.1034	.0734	.1034	.0934	.1234
Tallow City, extra loose .....	...	.0734	.0434	.0734	.0534	.0734
Edible, tierces .....	...	.0934	.0634	.0934	.0734	.0934
Acidless, tks, NY .....	...	.0934	.07	.0934	.0734	.1034
Turkey Red, single, bbls .....	.08	.0834	.08	.0834	.0734	.0834
Double, bbls .....	.1234	.13	.1234	.1334	.1234	.1334
Whale:						
Winter bleach, bbls, NY lb.	.073	.075	.072	.081	.07	.083
Refined, nat, bbls, NY069	.0710	.068	.076	.064	.081

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Cadmium Sulphide	Powdered Metals
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Calcium Stearate	Selenium
Carbon Tetrachloride	Silver Salts
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230 Fifth Avenue, New York, N. Y.



"We"—Editorially Speaking

1936 has been a grand and glorious year for chemical anniversaries. Last month, the twenty-fifth of the first rayon price list and the fiftieth of the granting of the first patent on a flotation process; but while we recorded these we were guilty of a serious omission when we neglected the eightieth anniversary of the discovery of the first synthetic dyestuff, "Mauve," by William Henry Perkin. It was on August 26, 1856,

that he received patent protection, and our esteemed British contemporary, *The Chemical Age*, states editorially, "On that day, throughout the plant world, flowers must have hung their diminished heads and drooped; man entered into a cave resplendent beyond measure compared with that to which Sinbad gained entry, unending in range and ramifications." Any one who has attended a Perkin Medal award and seen Dr. Marston T. Bogert wearing his treasured tie dyed with some of the first Mauve will more than likely agree with the bucolic enthusiasms of our cherished British confrère.

♦♦♦♦♦

Continuing the subject of anniversaries thirty years have elapsed since the passage of the Denatured Alcohol Law of 1906 opened up to industry the use of this cheap and versatile solvent. It is rather difficult to believe in 1936 that the principal uses thirty years ago were for heating and lighting. To U. S. Industrial Alcohol Company we offer our congratulations. On October 17th it will complete three decades of notable service: it was the first producer of "completely denatured" and has always remained the largest.

♦♦♦♦♦

For "the Quote of the Month" we nominate:

"The dangers of monopolies, at least in products of industry, exist only in speeches of politicians. All integral parts of industry are competitive with each other, and industry is competitive on a broad front with both services and farming."—Edgar M. Queeny.

♦♦♦♦♦

Wouldn't the cleanest way to settle the A. M. A.—A. C. S. imbroglio be to let "Doc" Fishbein and "Charlie" Parsons fight it out (toe-holds barred) to a knock-out? These vaunted champions of the mediceos and the chemics, as the case may be, should proudly welcome this opportunity to share in a badly needed revival of the ancient and honorable custom of settling sundry disputes by trial by combat. We make this suggestion in the most altruistic spirit, and we serve notice that if this Scientific Battle of the Century actually comes off, our seat in the press box is not for sale.

Fifteen Years Ago

From our issues of October, 1921

General Chemical building two new units at Pulaski, Va., plant.

George H. Jackle opens own office as broker in fertilizer materials.

Leading articles "What is a Chemist?" by Dr. M. L. Crossley, "The High Cost of Selling" by Frank L. McCartney, and "Marks vs. Dollars" by G. Lee Camp.

Bishopric and Lent Co. plan to develop sodium sulfate deposit at Moose Jaw, Saskatchewan.

Cornerstone laid for new Baker Chemical Laboratory at Cornell.

Chas. H. Herty elected president Synthetic Organic Chemical Manufacturers Ass'n.

Himmel & Co. buys stocks of goods on hand of Marden, Orth & Hastings, bankrupt.

World potash production on basis of comparative output is: Germany 6,000; France 10; U. S. 1.

Lawlor-McCormick Co. takes over naphthalene sales of Atlantic Chemical Works, Bayway, N. J.

Oscar Smith new president of Parke Davis & Co.

Du Ponts revise organization plan with following general department heads: R. R. M. Carpenter, cellulose; C. H. Patterson, explosives; Chas. A. Meade, dyes; Hunter Grubb, paints; C. W. Phellis, Pyroxylin; J. P. Laffery, legal; Finne Sparre, development; S. M. Pierce, engineering; C. L. Reese, chemical; C. F. Brown, advertising.

耐蝕性 タンタラム 原素金属

耐酸及耐アルカリ性大ニシテ價格ハ白金及金ニ比シテ著シク廉ナリ、硬度モ高シ、近代化學工業界ノ寵兒タリ

下記用途ニ盛ニ應用セラル

1. レーヨン及ステープルファイバー各種ノズル
2. レーヨン用ガイド
3. 硫酸濃液等ノ各種酸及苛性碱製造用容器
4. 無線電送受信機真空管プレート電極
5. 飛行機部品
6. 特殊合金

鐵、鋼、銅、鉛、鋅、錫、鎳、鉻、ニッケル、各種アリ
文 献 御 申 越 々 奉 附 呈

東京市京橋區銀座四丁目二番地

服部貿易株式会社

電話京橋(56)二一—五番(代表)

Can You Read This?

Above is a Japanese advertisement of tantalum, an elementary metal refined and fabricated by Fansteel Metallurgical Corporation.

♦♦♦♦♦

"Why he doesn't even know caustic soda from caustic acid."

"He must be one of these new sub-atomic chemists."

♦♦♦♦♦

The curse of technocracy still continues to be inaccuracy, for the new magazine *Technocracy* prints "corcuit" for circuit and "carrousel" for carousel on the index page of its August issue.

♦♦♦♦♦

Did you know that—

R. Lindley Murray, chief engineer, Hooker Electrochemical, carried the name of Niagara Falls to the top of the tennis world when he won the national singles championship in 1918?

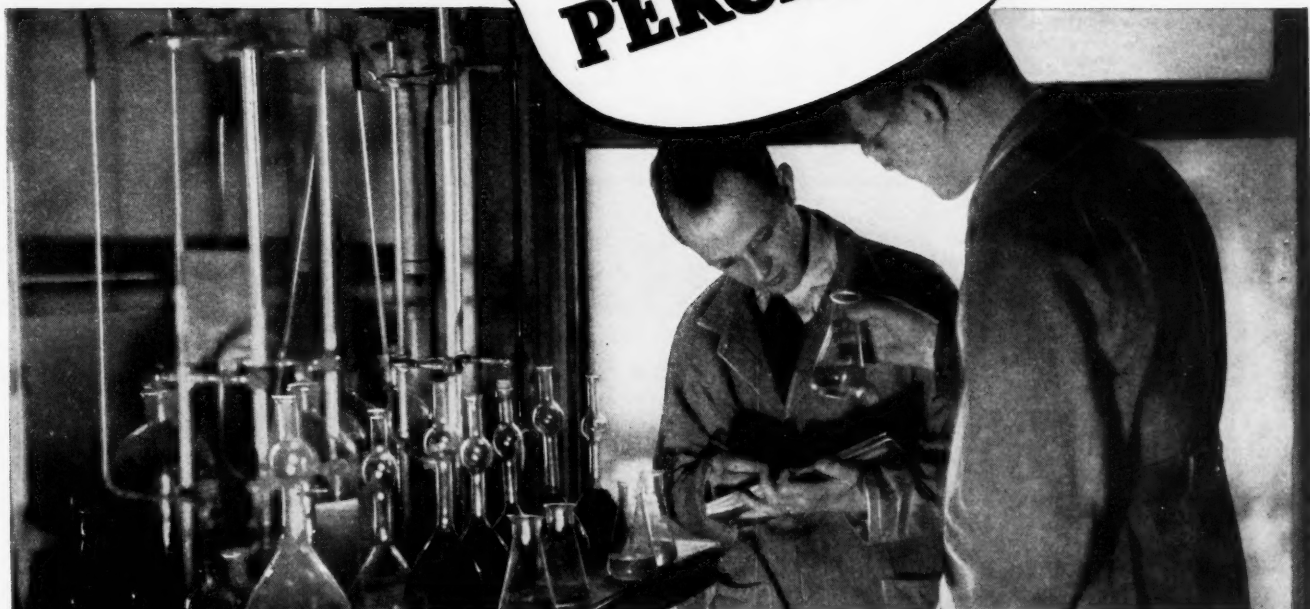
♦♦♦♦♦

We see by the *Wall Street Journal* that Air Reduction is building a plant for "its subsidiary," Linde Air Products, at Niagara Falls. Generous we call it—specially so to the stockholders of Union Carbide.

♦♦♦♦♦

Coming next month—"Mercury as a Chemical Raw Material" and "Chemical Industry by Government Decree."

HYDROGEN PEROXIDE



WARNER QUALITY PRODUCTS

Acid Phosphoric
 Aluminum Hydrate
 Barium Peroxide
 Blanc Fixe
 Carbon Tetrachloride
 Chlorine—*Liquid*
 Caustic Soda—*Liquid*
 Caustic Soda—*Flake*
 Caustic Soda—*Solid*
 Sodium Hypochlorite Solution
 Carbon Bisulphide
 Mono Sodium Phosphate
 Di Sodium Phosphate
 Tri Sodium Phosphate
 Sodium Sulphide
 Sulphur Chloride—*Yellow and Red*
 Water Treating Compounds

DIVISION OF

Let the Warner Technical Staff explain the modern, money-saving advantages of specially treated wooden storage tank installation and pipe-line-to-bleach-bath method. Easier to handle. Saves space.

THE uncertainties and instabilities that surrounded Hydrogen Peroxide manufacture in the past and necessitated its production for commercial uses in 100 volume concentration only, no longer exist.

Warner, after several years of research and development and ownership of all raw material sources, brings to the bleaching industry a quality Hydrogen Peroxide of highest stability and uniformity in 25 volume which has won the fullest confidence of prominent users.

To extend and maintain this high standard of product and service to its clientele, Warner, at its Carteret, N. J., plant, has established wide facilities for immediate volume production and quickest delivery in carboys, barrels or tank trucks within 120 miles of this point.

The obvious savings effected through this modern service are important to modern bleacheries. A thorough discussion with the Warner Technical Staff of the several advantages is invited. An inquiry will bring prompt reply.

WARNER CHEMICAL COMPANY

Pioneer Producers 1886

CHRYSLER BUILDING

NEW YORK CITY

155 EAST SUPERIOR STREET, CHICAGO

70 RICKARD STREET, SAN FRANCISCO

WESTVACO CHLORINE PRODUCTS.